

COMPUTERWORLD

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VOL. XIX, NO. 24



Crystal ball
Profile of the
Gartner Group/91

Jump start
Weekend
installation
of NAS 8083/87

In Depth
Cloning the IBM
Personal
Computer: Who's
closest?/43

MMA to seek publishers' support on site licensing

By Edward Warner
CW Staff

NEW YORK — The Microcomputer Managers Association today plans to call officially upon personal computer software publishers to provide corporate users with software site licenses. The MMA said these agreements could free the micro managers from concern about software piracy.

In a press conference at PC Expo, a personal computer trade show here, the MMA will define what it calls a "negotiated license agreement" as an "unbundled agreement negotiated individually between the vendor and the [user] company," according to MMA President Allan Gross. Such agreements are often called site licenses because they permit corporate software users to license a package for use on multiple personal computers within their firms.

The MMA, which includes members

from 85 New York-area Fortune 1,000 firms, will propose that three types of software licenses be made available: volume purchase agreements; limited licenses, under which the user would be able to make a specified number of copies; and unlimited licenses, under which copying would not be restricted.

Gross, a personal computer manager with an investment banking firm, said one of the micro managers' goals is to eliminate the software retailer from corporate software buying, leaving only direct vendor sales. Referring to what he called the lack of support that retailers give corporate users, Gross claimed, "We get very minimal service for such a chunk of the price [that we pay]."

In issuing a formal call for site licensing, Gross said, the MMA was also expressing frustration with the effort required to

See **LICENSE** page 8

Uccel tools integrated under MVS

By John Gallant
CW Staff

DALLAS — Uccel Corp.'s Systems Software Division last week harvested the first fruits of a strategic development push aimed at tying together its complete line of systems software packages for IBM MVS shops. The product introductions came one day after rival Computer Associates International, Inc. announced the integration of its MVS systems software into a single product offering [CW, June 10].

Announced to more than 1,300 users at the company's Systems Software Conference users group meeting here, Uccel's Synova series is aimed at helping users integrate Uccel systems products and in-house-developed data center management tools through common logon, communications and command facilities. A spokesman said that when it is completed, the Synova series — whose name is a hybrid of the terms synergy and innovation — will consist of four tiers of products.

The first level is a generalized logon/logoff facility, which Uccel unveiled last week in the form of its Nova:Log package, that allows for common access to all the company's systems packages. The second is a common command language for use across Uccel's product line. The third level is a standard communications facility for data exchange across the firm's product line.

The remaining level consists of what the spokesman labeled "high-level components" handling specific data center man-

See **UCCEL** page 12

TOP OF THE NEWS

IBM tempered its 1985 business forecast with a less-than-positive earnings outlook, although reports indicate very heavy 3090 shipments in the fourth quarter. **Page 2.**

Users of Wang's Wangnet are busily exploring applications that are available on the broadband local-area network. **Page 4.**

Seek and ye shall find. The American Mathematical Society developed its own benchmark tests to evaluate a major

high-end system purchase. **Page 6.**

The switch is on. Some users are finding that it makes sense to add hardware to analog voice switches, rather than buy digital switches, to obtain data support. **Page 7.**

Interactive Systems/3M unveiled a local network said to be the first 10M bit/sec. product that conforms to GM's Manufacturing Automation Protocol standard. **Page 83.**

Demand low for smart buildings

By John Dix
CW Staff

WELLESLEY, Mass. — Building developers are rushing to construct smart buildings, despite a lack of user demand and their own belief that services will not attract tenants, according to a study conducted by Telematics-Resource Group, a market consultancy here.

Intelligent buildings typically enable tenants to share telephone switches, long-distance telecommunications services and computers. They may also provide for shared use of security, climate and lighting control systems.

According to Telematics, roughly 60% of building developers are currently considering, planning or implementing so-called shared tenant services, although these services are still part of a fledgling industry. "The majority of developers are planning to implement these services while admitting it won't do anything for

them," according to Telematics President Marc Rudov.

Telematics contacted 55 real estate developers and asked them, among other things, where they thought tenants would rank shared services on a list of demanded features. "[More than] 90% of the firms ranked shared tenant services on the bottom of the list," Rudov said, behind concerns like price of the lease, building location, free parking and proximity to modern conveniences.

"Developers told me that even though they were installing shared tenant services, they did not believe they would gain new tenants by doing so," Rudov said. "Most of the developers considered the services an amenity."

Prospective tenants are also lukewarm toward shared services.

Of the 245 users who responded to Telematics' mail survey, 70% said they

See **SMART** page 10



Burroughs, Sperry to wed?

NEW YORK — Sperry Corp. and Burroughs Corp. jointly announced Thursday that they are involved in merger negotiations. If consummated, the merger would produce the most drastic restructuring of the mainframe computer business in more than a decade.

At press time, neither company would comment beyond a terse 24-word statement announcing the negotiations. The combined revenue of the two companies last year was \$10.5 billion. The collective installed base of the two companies represented 13% of all large-scale computer systems at the end of 1984, and together they had a 10.8% market share of all large-scale shipments during 1984, according to International Data Corp., a Framingham, Mass.-based market research firm.

If Sperry turns out to be the submitter, See **NEGOTIATE** page 11

NEWS

Akers predicts IBM profit dip

By Peter Bartolik
CW Staff

YORKTOWN HEIGHTS, N.Y. — IBM President and Chief Executive Officer John F. Akers said last week the company now expects profits for the first nine months of this year to be less than profits for the first three quarters of 1984.

Akers' comments to securities analysts here last Wednesday included a downward revision of earlier projections and sent IBM stock plummeting by more than \$5 per share in two hours of trading on Wall Street the same day. Earlier, the company said it expected second-quarter profits to be down slightly from the year-earlier period but that it expects the second half of the year to produce solid growth for the fiscal year.

Akers said customers are still carefully evaluating the announced 3090 mainframe products and that intermediate-size systems shipments are below expectations; Personal Computer product shipments will continue to increase for the remainder of the year but not at "the torrid pace of last year," he noted. Akers added that the company had moved up the general availability of the 3090 Model 200 from November to early October.

Charles Greco, a vice-president with Framingham, Mass.-based International Data Corp., said a recent survey of 816 sites using 3080 series machines revealed that more than 370 of the Model

200s will be installed this year, with more than 300 of those installations coming in the fourth quarter. During the next 18 months, he said, those 816 sites will accept 1,055 of the new mainframes.

IBM now projects that the rate of all shipments this year will increase by 20% over last year, Akers said, compared with earlier projections of a 30% increase. He said IBM still expects total revenue this year of more than \$50 billion, up from \$45.9 billion in 1984.

In the first three quarters of 1984, IBM had profits of \$4.4 billion. In the first quarter of this year, the company posted profits of \$986 million.

Akers said economic growth in the U.S. is "in a lull," primarily owing to massive increases in imports. "The combination of high imports and [an] unprecedented upsurge of capital spending [in recent years] has caused customers to pause [and] reassess the pace of their individual company growth and investments," Akers asserted. "It therefore has had a direct impact on our industry."

Regarding earlier projections, Akers said he had also qualified previous comments with the observation that an economic downturn would have an impact on IBM.

"That slowdown has come, and achieving the solid growth we expected then for 1985 is now unlikely," he said.

Random access

Information Builders, Inc. will roll out enhancements to its PC/Focus line of fourth-generation language/data base management system software today at PC Expo in New York. Announcements will include a multiuser version for IBM and Nestar Systems, Inc. microcomputer local-area networks; Release 1.5 of the single-user PC/Focus package, with improved ease-of-use features and enhanced asynchronous communications protocols; and a host-language interface that allows developers writing applications in other languages to use PC/Focus data bases.

Cullinet Software, Inc. has until September 1986 to come up with an alternative to its General Ledger (G/L) software if its appeal against McCormack & Dodge Corp. proves unsuccessful, according to company Founder John Cullinane [CW, June 10]. As yet, the company has not decided whether to create or buy another G/L application package to offer its international users. According to Cullinane, panic has resulted from the case, with people believing they will lose all rights to the G/L software purchased from Cullinet, "which is absurd." Cullinane also said that an enhanced version of the Goldengate micro-to-mainframe product is under development, claiming the product is a major force in Cullinet's integration strategy.

Amdahl Corp. expects to announce the first customer shipments of its two IBM-compatible supercomputer models by the end of the current quarter, according to company President John Lewis. The "hot list" for the Models 1100 and 1200, whose introduction last year marked Amdahl's formal entry into the vector processing realm, is said to exceed 20 prospects.

An award for the best hardware, software and computer system product in the industry will be given for the first time this year at the National Computer Conference in Chicago. The awards are being cosponsored by the American Federation of Information Processing Societies, Inc. and *Fortune* magazine and will supplement the professional recognition awards.

Look for a September unveiling of a global networking software product from Software Research Corp. The package, currently in beta test at three major sites, will enable dissimilar computers running dissimilar applications to swap data on a peer-to-peer level, according to a company source. Specializing in network software and services, Natick, Mass.-based Software Research has grown geometrically the past two years with the help of healthy infusions of venture capital and is the author of Docupower, an IBM Distributed Office Support System interface package.

IBM may be readying further strategic alliances with telecommunications services that will enable it to tailor its products to local telephone exchanges like citywide data switching. An example of this strategy may soon be announced between IBM and Bell Atlantic Corp., the regional holding company where a joint business arrangement is reportedly being finalized.

Hewlett-Packard Co. is expected to introduce a laptop computer in the first or second week of July. The machine, to be called the Portable Plus, will feature expanded memory and a larger display and will be priced substantially less than the \$2,995 current model, according to sources within HP. The Portable Plus display will be 25 lines by 80 columns, compared with the Portable's 16 lines by 80 columns.

Visicalc, 5, was top spreadsheet

By Edward Warner
CW Staff

A chief catalyst of the boom in corporate personal computing died last week at the age of 5.

Announcement of the passing of Visicalc, the first popular electronic spreadsheet, was low key: a paragraph in a press release from Lotus Development Corp., Visicalc's new owner. Lotus said it would discontinue the product but would support users for two years.

For some of those who remembered Visicalc, though, its passing was regarded with a touch of regret. The spreadsheet, introduced for the Apple Computer, Inc. Apple II in late 1979, sold 600,000 copies in its lifetime and was said to have been the first to make business aware of the power of personal computing.

It was foremost, according to one user, "an easy product to use." That user, Norm Dewitt, director of the Personal Computer Industry Service at San Jose, Calif.-based market research firm Dataquest, Inc., said that when he first encountered Visicalc in 1982 — as an employee of IBM's Personal Computer Group — Visicalc was the only spreadsheet for the IBM Personal Computer.

Other users, though, had no love for Visicalc. Though he mourns the loss of the magic of the Visicalc name, senior analyst Chris Christiansen at the Yankee Group said he "never liked [Visicalc] very much, especially after [Lotus'] 1-2-3 came out."

Visicalc had been ailing ever since the introduction of 1-2-3, largely due to its failure to match the improvements in the Lotus product, Dewitt observed. Lotus' 1-2-3, for example, offers menus that spell out functions; Visicalc used letters to symbolize its commands, and "you had to know what each one of those letters meant," Dewitt noted.

To worsen its troubles, Visicalc's developer, Software Arts, Inc. of Wellesley, Mass., became embroiled in a legal dispute with Visicorp, the firm that marketed Visicalc. Software Arts eventually won rights to Visicalc but was weakened by the battle. The firm was acquired by Lotus in April.

In what may be a token of memoriam, Lotus said it will offer users of the IBM Personal Computer version of Visicalc the opportunity to upgrade to 1-2-3 for \$250.

NEWS SUMMARY

Wang's Wangnet customers are expanding their use of the product by exploring other applications/4

The American Mathematical Society designed and conducted its own benchmark tests and chose a DEC 8600-based system/6

Add-on devices provide needed data handling capabilities to older analog voice switches, the first user of David Systems' Information Manager reported/7

Adapso's Software Protection Committee is expected to announce within two months its progress in software authorization/8

CW at Future Computing: A data center checkup revealed that the Queen's Medical Center in Honolulu sacrificed control for productivity . . . Computer users should integrate all their data dictionaries into a central directory/12-13

CW at Uccel: Hardware advancements will extend the role of micros as artificial intelligence machines . . . Although AI research is steadily progressing, the industry is still in its infancy/14-15

IN DEPTH

How compatible is it?/43

International Report/24

Call for Papers/36

Calendar/37

EDITORIAL/40

SOFTWARE & SERVICES/57

MICROCOMPUTERS/73

COMMUNICATIONS/83

SYSTEMS & PERIPHERALS/87

COMPUTER INDUSTRY/91

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NEWS

Wangnet users exploring net's broadband applications

By Paul Korzeniowski
CW Staff

Many customers of Wang Laboratories, Inc.'s Wangnet purchased the product to solve one specific problem, and only recently have they begun to explore other applications available on the broadband local-area network.

The capacity of Wangnet is divided into five bands, each of which has a different function: the Wang Band permits communications between Wang systems at speeds up to 10M bit/sec.; the Peripheral Band connects Wang workstations and peripherals to IBM 3270 series devices; the Interconnect Band can be used to support multiple types of devices working with standard protocols; the Utility Band supplies video applications; the Professional Computer Service connects Wang Professional Computers to the network.

In 1983, Ethicon, Inc., in Somerville, N.J., attempted to determine how to add 50 terminals to its five Wang minicomputers. Rather than purchase additional systems, the company decided to install Wangnet. This enabled the company to use its existing hardware to support the additional terminals efficiently.

"If we hadn't purchased Wangnet, we would now have seven or eight minicomputers," noted Robert A. Richard, lead communications analyst at Ethicon. "Also, the network helped to reduce cable costs through our two-story complex." Another

benefit is that document and file transfers are supported on the Wang Band.

While connecting Wang devices over the Wang Band was relatively simple, using the Peripheral Band to connect Wang users to Ethicon's IBM 3081 Model K mainframe has proven to be difficult. "For a month, we tried to attach a modem to the network, but it never worked," Richards said. Wang sells its Cmux D3270 modem that can be used to attach an IBM 3270 communications controller to the network's Peripheral Band.

Problems arose because the Cmux D3270 did not support Ethicon's IBM 3274 Model D controller. "I've been told that other controller models run fine," Richards stated. Ethicon expects a model of the modem to arrive in two weeks and plans to field test the unit.

The University of Wisconsin was one of the early users of Wangnet [CW, May 16, 1983]. Today, the network supports 47 Wang Office Information Systems, seven VS minicomputers, 1,200 Wang terminals and 500 other terminals on the network.

Rather than connecting IBM mainframes to Wangnet through the Peripheral Band, the University connected them through fixed-frequency channels on the Interconnect Band. Thomas Scott, manager of data communications, reported no problems attaching the users to the mainframe.

Scott is very satisfied with the network but listed a few problems. "It would be helpful if there

was compatible system software across Wang's product line," he said. "Often, the microcode for some of the systems is incompatible."

Scott is not satisfied with Wang Band's transmission speed. "I don't think it works at a speed of 10M bit/sec.," he said. Also, he would like to allocate ports dynamically. Devices on some bands have to be assigned to specific ports. "We could have more users on the system if we could dynamically allocate ports," he explained.

General Foods Corp. in Rye Brook, N.Y., was most interested in Wangnet's videoconferencing capability. When the company constructed a new building in 1982, it wanted to include network wiring in the building plans. "It was a perfect time for us to lay the wires down," noted Michael Greco, manager of office systems at General Foods.

Greco stated that a baseband network would not have enough bandwidth to support a video system. "Also, we couldn't wait for a product that was being developed," he added. "Wangnet was really the only product that was available when we needed it."

Today, General Foods works with seven television channels on the Utility Band. There are 28 conference rooms and a television studio attached to the video network.

Greco concluded, "We bought the system for its video capability. Any other applications it provides [are] a bonus."

Wang reaping benefits of unclear IBM net strategy

By Paul Korzeniowski
CW Staff

Wang Laboratories, Inc. appears to be a primary beneficiary of IBM's unclear network strategy.

"IBM and AT&T are touting network schemes that may be the dominant future architecture," stated Mark Stahlman, an analyst at Sanford C. Bernstein Co., a New York investment firm. "But if a company wanted a comprehensive network today, it would probably require a broadband network. Who would a company turn to? [Sytek, Inc.? Unger-mann-Bass, Inc.]? Probably not." Stahlman predicted that a company would probably have some Wang equipment and a relationship with that vendor, so it would be inclined to purchase Wangnet.

Wangnet, announced in 1981 with first shipments in 1982, created a great deal of interest. "There was a lot of hype about the product because it was billed as a cure-all," Stahlman noted. "That has not turned out to be the case."

When it was announced, Wangnet was perceived as an alternative to baseband Ethernet networks. Wang and Ethernet proponents debated the virtues and vices of the two network approaches. "The broadband vs.

baseband debate has been settled," noted William Rosenberger, director of strategic planning at the Yankee Group, a Boston market research firm.

"Companies realize that both approaches are suitable for specific applications. If there is a large installation base that has to be tied together, then broadband is appropriate. However, broadband will cost more than baseband," Rosenberger said.

Rosenberger added, "There are probably more Ethernet networks sold, but there are more terminals on Wangnet. The Wangnet customers tend to have elaborate networks with a large number of terminals." Wang estimated that there have been between 300 and 400 Wangnets and an equal number of Fastlans, a scaled-down version of Wangnet, sold.

Despite the impressive number of installations, analysts listed some product shortcomings. "The network works well for Wang-to-Wang connections, and it makes sense for a company with a large number of VS or OIS systems to install Wangnet," said Kim Myhre, director of communications industry research at International Data Corp., a Framingham, Mass.-based market research firm.

"However, most large companies

have substantial investments in IBM. It was only recently that Wang opened the network up so it supports capabilities in addition to simple IBM 3270 [series] terminal emulation."

Recently, Wang announced gateways to IBM's Systems Network Architecture, Distributed Office Support System and Professional Office System. The company may also add support for IBM PC Network and for a maximum of five Ethernets to the network, according to a company spokesman. The spokesman stated that only 65M bit/sec. of the product's 390M bit/sec. bandwidth are currently utilized.

Another drawback cited by analysts was Wangnet's high cost. "Wang products traditionally have been high priced," said Linda O'Keefe, associate director of office system industry service at Dataquest, Inc., a San Jose, Calif. market research firm. "If Wang would drop the price of Wangnet, it would sell

much better."

IDC's Myhre added that the introduction of Fastlan helped to spur sales of the product. "Companies would rather look at the product in a controlled way, rather than installing a complete system," he noted. Initially, Wangnet was the victim of a number of delays and product snafus. "Some early adapters had to wait to receive the product, and sometimes the parts didn't work."

How would IBM's announcement of its token-ring local-area network and evolution of its cabling plan affect Wangnet? O'Keefe predicted, "Wang will incorporate the IBM network into Wangnet and attempt to offer superior network management facilities to stay a step ahead of its competitors."

O'Keefe concluded, "This year represents a watershed year for local-area networks. Wang should be able to profit from an increase in these sales."

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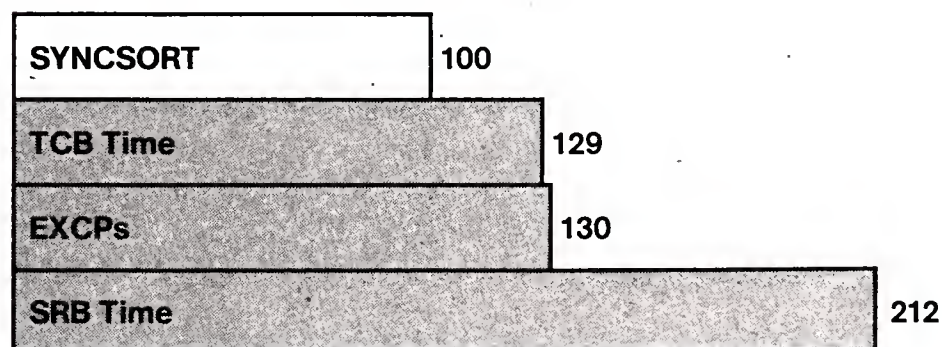
In an extraordinary move, Sortland Yard today warned data processors throughout the world to be on guard against what it termed "gentleman-bandit sort programs."

The warning was issued by one of the Yard's best known figures, Inspector SyncSort, who has sometimes been called "a legend in his own CPU time."

The inspector said, "One of the difficulties in apprehending these chaps is that they look so eminently respectable. They're members of a fine old hardware family. They've been to the right schools. And they invariably carry out their burglaries while wearing a dinner jacket from Saville Row."

EXPERT COMPUTER CRACKERS. "But once the party is underway," the inspector said, "these chaps head straight for the place where the family jewels are kept. They can crack open a computer and make off with a king's ransom in computer resources before you can say 'Hound of the Baskervilles.'"

To indicate "the true cost of this sort of misbehavior," the inspector released the following crime statistics:



DFSORT, Release 7.0

SOMETIMES TAKE HOSTAGES. The inspector noted that these black-sheep programs often "take a dreadful toll" of programmers. "They are often tied up for days on end and forced to perform unnecessary coding, compiling and debugging. And they are heartlessly deprived of the labor-saving features that are taken for granted in most parts of the civilized sorting world."

Among these the inspector listed:

- SORTWRITER
- MULTIPLE OUTPUT
- RECORD EDITING
- FAST FILE COPY
- MAXSORT

TELEPHONE BEST DEFENSE. The inspector urged data processors to call the Yard immediately if they suspect their center is infested by a Raffles-type sort program. "The number is (201) 568-9700. We'll send over one of our highly trained sort detectives to track the culprit down."

Questioned as to what would be done with sort programs caught burglarizing computer centers, the inspector replied. "They will be given a just and speedy trial. If found guilty, they will immediately be transported to Iran!"

NEWS

Homegrown benchmarks key to system purchase

By Donna Raimondi
CW Staff

PROVIDENCE, R.I. — Faced with the need for a system, the American Mathematical Society here designed and conducted benchmark tests pitting a machine from IBM against one from Digital Equipment Corp.

After reviewing test results, the society chose a DEC 8600-based computer system to meet its needs for the next five years. According to Samuel Whidden, director of computer services, the society developed benchmark tests from its applications for several machines, including an IBM 4381 Model 2 mainframe computer. The society runs mostly Cobol business applications and performs scientific typesetting functions, Whidden said.

The benchmarks consisted of having the machines run a version of the society's typesetting software, Cobol and Fortran compilers and one of the society's Cobol applications.

The society's search — originally encompassing eight vendors' systems — narrowed to the three following possibilities:

- A DEC 8600-based system that called for two 8600s, one to be delivered by December 1985 — with a DEC VAX-11/785 serving as a temporary fill-in until then — and the second one to be delivered in 1987.

- An IBM plan that contained an initial 4381 Model 1, to be upgraded in two years to a 4381 Model 2 and upgraded again in 1989 to a 4381 Model 3.

- An IBM option that called for a

4381 Model 1 that would be upgraded to a 4381 Model 2 in 1987 with no further upgrades.

A stand-alone VAX 8600 with a floating-point processor that ran the society's benchmark tests was 4.8 times more powerful than the society's present DEC Decsystem-2060 running the vendor's Tops-20 operating system, the planning committee's final report stated. The IBM 4381 Model 2 was 4.64 times more powerful when the machines were compared in a stand-alone mode, that is, running one test at a time, according to the society's "Planning Group Report on Computer Systems Evaluation."

When loaded with several jobs in batch mode or several users in interactive mode, the DEC 8600 tested at 5.11 times more powerful than the Decsystem-2060 and the 4381 Model 2 showed that it was 4.73 times more powerful.

DEC provided Fortran Whetstone and Cobol U.S. Steel benchmarks as well, the report stated, but IBM did not include such tests for its system. "There is a lot that [benchmark tests] lack," Whidden said. "They may not be relevant to anyone else, and may not forecast well for us, but they are all we could devise to work for us."

Overall ratings (see chart above), which were calculated from the typesetting run and the Cobol application run, weighted 12:1 in favor of the application to give an accurate reflection of the society's current Cobol/typesetting load mix.

IBM was unwilling to run the

Benchmark test results

System	Digital Equipment Corp.		IBM
	Decsystem 2060	VAX 8600	4381 Model 2
Memory	1M words (36-bit word)	12M bytes	16M bytes
Relative Overall Power			
CPU Stand-Alone	1.0	4.80	4.64
CPU with Load ²	1.0	5.11	4.73
Wall Clock Time Stand-Alone	1.0	2.58	2.50
Wall Clock Time with Load	1.0	7.37	8.86
Relative Power Application Run			
CPU Stand-Alone	1.0	7.64	9.52
Wall Clock Time Stand-Alone	1.0	2.68	2.83

¹ Numbers under VAX 8600 and IBM 4381 Model 2 represent number of times more powerful than Decsystem 2060, with rating of 1.

² A loaded system is defined as one running the following: in batch streams — a typesetting job, the Cobol benchmark, a Cobol compile, a Fortran compile; interactively — various users editing, sending mail, using office automation, software.

Source: American Mathematical Society Report

benchmark tests on a 4381 Model 3 configuration, which is a tightly coupled pair of 4381 Model 2 machines, Whidden said, because the company felt the results would not be valid. The vendor said — and the society accepted as true — that a Model 3 would provide 1.7 times the performance of the Model 2, he said.

IBM machine not as fast as 8600

The IBM system would not run as fast as the 8600 configuration, the report said. The planning group also found the IBM machine more difficult to use because of the complexity of the VM operating system.

The society's benchmark tests did not confirm the planning committee's expectation that the IBM 4381's throughput would be superior.

The stand-alone 8600 showed a 94% proportion of CPU time to real

time when running the typesetting program as opposed to the 4381 Model 2's 89%, the report said. When running the same program loaded, the machines showed 58% and 49% proportions, respectively, it said.

The IBM machine showed a better throughput time in the loaded application run test, with 16% proportion; better than the 8600's 12% proportion, the report showed. In stand-alone mode running the application program test, the 8600 achieved 26% efficiency over the IBM machine's 22% proportion.

As part of the benchmark, the vendors had to do whatever conversion work was necessary to get the benchmark programs running on their hardware, the report said. The machines that were tested were configured similarly to those the society would buy, the report said.

Tandem pledges long-term network standards support

By Jeffry Beeler
CW West Coast Bureau

CUPERTINO, Calif. — In addition to introducing five software packages that promote the interchange of documents within its own network [CW June 10], Tandem Computers, Inc. recently disclosed its long-term intention to support a broad assortment of communications standards.

On the local network side, the company promised to support the IEEE

802.3 standard, which would permit Tandem networks to be interconnected with Ethernet-type networks. On the gateway side, the firm promised support of IBM LU6.2 protocol, which would enable Tandem mainframes to link to IBM hosts running IBM's Distributed Office Support System and X.400, the interface for hooking systems into public electronic message nets recommended by the Consultative Committee on Interna-

tional Telephony and Telegraphy.

Tandem also announced the start of internal projects to develop support for IBM's Document Content Architecture and Document Interchange Architecture, which translate the format differences between dissimilar word processors and thus enable them to exchange information.

In addition, the company disclosed a recent agreement that makes it a licensee for AT&T's Digital Multiplexed Interface standard, which enables host processors to be connected to private branch exchanges.

Tandem also announced it had signed licensing agreements with Sytek, Inc., a Mountain View, Calif.-based supplier of broadband local networks. One of the agreements calls for Tandem to support Sytek's protocols for IBM's Personal Computer Network, providing for interconnection of IBM micros with Tandem's mainframes or workstations. Another accord will result in Tandem's support of Sytek's open-architecture Local Net product line.

About half the planned communications support will be made available by the summer of 1986, with the rest slated for readiness sometime within the following year, according to Kathryn Weiner, a Tandem product management director. However, Weiner declined to reveal any additional details about the firm's expect-

ed delivery timetable.

Announcement of Tandem's planned communications support coincided with the christening of the company's Information Management Technology (IMT) strategy, which calls for the use of the vendor's existing facilities to interconnect various incompatible machines and nets.

With the recent introduction of five electronic mail and filing programs, Tandem has already accomplished part of its objective by permitting information to be exchanged among selected multivendor terminals and micros. At present, however, the interconnection scheme applies only to devices that are connected directly to a Tandem net.

The next logical step in the evolution of IMT will be to widen the interconnectivity to ensure that information can be transmitted, not just between users in the same network type but also between different, incompatible networks. Here is where Tandem's plans for supporting a broad range of communications standards enter the picture, according to a company source.

Once support of the 802.3 standard becomes available, for example, a user whose device connects directly to a Tandem network will be able to communicate transparently with someone in an Ethernet or Starnet scheme, Weiner said.

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NEWS

Add-on unit solves firm's need for voice/data support



FIRST USER

There is more than one way to skin a cat. Some users are finding it makes economic sense to add hardware to existing analog voice switches to obtain data support rather than buying a digital switch.

Gould AMI Semiconductors, a Santa Clara, Calif.-based division of Gould, Inc., did just that. After serving as the beta test site for the first product from Sunnyvale, Calif., start-up David Systems, Inc., the semiconductor development firm purchased the Information Manager.

The Information Manager is a device about the size of a two-drawer file cabinet that can be used to provide integrated voice/data support over twisted-pair wire when used with analog private branch exchanges or Centrex services.

Gould AMI is using the Information Manager with its AT&T Dimension 2000 PBX, installed in September 1981, according to Don Ohler, department manager of communications. The David Manager, the heart of the system, is located in a PBX wiring closet and is connected to the Dimension — which supports nearly 1,500 extensions — through a David Gateway over twisted-pair wire.

Roughly 120 of the Dimension users are supported through the David Manager. Of these, nine are voice-only users, 40 are voice/data and 70 are data-only users, Ohler said.

Voice-only users have David telephone sets that emulate AT&T 1A2 key systems, telephones that support multiple lines that are typically used by secretaries to monitor departmental phone groups. These sets provide multiline support over a single twisted-wire pair instead of the 25-pair cable that 1A2s typically require.

Voice/data and data-only users are supported with David Links that operate at 2M bit/sec. over a single twisted-pair wire. The capacity of a David Link is divided into four channels: a 1M bit/sec. packet-switched channel, a 64K bit/sec. channel for pulse-code-modulated digitized voice, a 64K bit/sec. circuit-switched channel for data and a 64K bit/sec. channel for signaling.

For its data-only connections, Gould AMI uses David interfaces called dual asynchronous device adapters. These adapters provide two RS-232C interfaces and are connected to the David Manager through existing twisted-pair PBX wire, Ohler said.

Voice/data connections are provided through David Links and David telephone sets. The sets digitize voice to be carried over the 64K bit/sec. pulse-code-modulated voice channel and provide Gould AMI with an RS-232C interface for terminal support. The David Manager converts the digitized voice signal into analog and routes the circuit to the Dimension PBX. The data channel is routed to the desired computer resource.

Gould AMI is using the circuit-switched data channel of the David Links to support asynchronous terminal devices, Ohler said.

The David Manager is installed in Gould AMI's design center. Gould

The Information Manager is a device . . . that can provide integrated voice/data support over twisted-pair wire when used in conjunction with analog private branch exchanges or Centrex services.

AMI customers send system engineers to the center to design custom-integrated semiconductor circuits. The engineers, who have their own soundproof offices, own their workstation devices but can access Gould AMI computer resources through the

David Information Manager, according to Barbara Kalkis, a Gould AMI spokeswoman. Engineers can switch between Gould AMI computers using the Information Manager and software bridges developed in-house.

Ohler said the Information Manag-

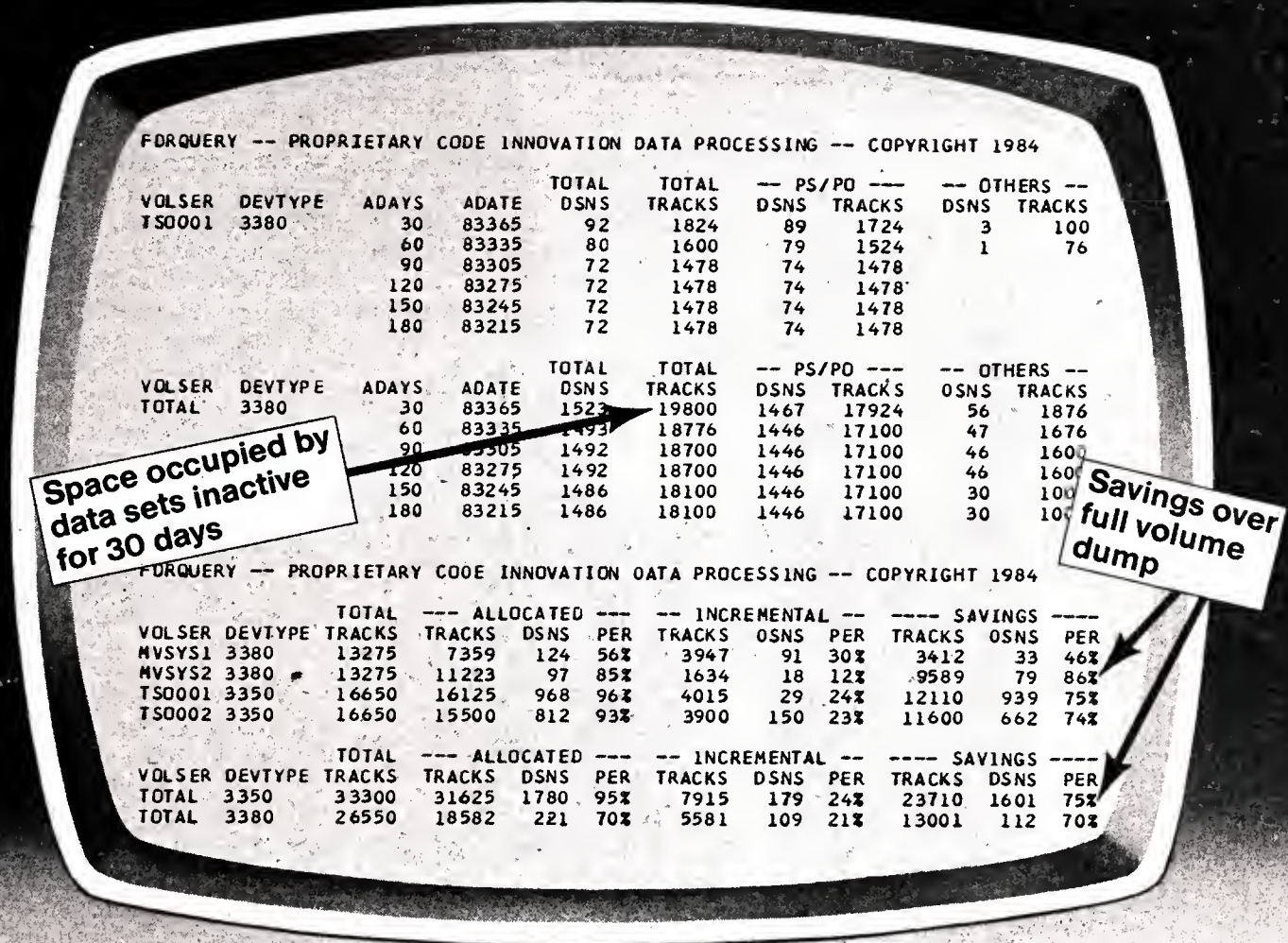
er system took roughly a week to install and that few problems have been experienced from the time the system was installed for beta test.

The company reportedly briefly considered installing a digital PBX instead of the David Systems equipment, Ohler said. However, at today's average cost per station, Ohler estimated it would have cost about \$2 million to replace the company's Dimension 2000.

Ohler would not divulge the cost of the Information Manager, but David Systems claimed the system costs roughly \$800 per port.

David Systems is located at 701 E. Evelyn Ave., Sunnyvale, Calif., 94086.

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NEWS

Adapso making progress on software protection device

By Paul Korzenlowski
CW Staff

The Association of Data Processing Service Organizations, Inc.'s (Adapso) Software Protection Committee is expected to announce within two months progress in its attempt to design a software authorization mechanism.

The Adapso mechanism consists of three parts: lock, key and key ring. The lock is code that is embedded in a program that prevents it from running. The key is a microprocessor stored on a key-like device that plugs into a key ring, opens the lock and allows a program to run. A key ring has a number of key slots and uses an RS-232 port to communicate with one or more programs.

The committee has made progress on the problem of how a key would fit into a key ring. The design is based on work by Apple Computer, Inc. engineers, a spokesman said.

"Adapso was searching for an inexpensive key, and the work at Apple helped to provide that," said Marv Goldschmitt, committee chairman and vice-president for business development at Lotus Development Corp., in Cambridge, Mass.

Apple's approach differs somewhat from the original Adapso design. The software protection committee was thinking of connecting a key to a ring through an eight-prong connector. Although this type of connector could have been used, it would have been expensive, Goldschmitt said.

The Apple design is based on a three-pronged connector much like the one used with a Sony Corp. Walkman. David Christensen, project engineer at Apple, estimated that the connection would cost \$3 to \$5, much less than the connector the committee was considering.

"Apple used a Walkman connector as an audio port for the Apple IIc," Christensen noted. "I don't think that any other computer manufacturer has

”

'Adapso was searching for an inexpensive key, and the work at Apple helped to provide that.'

— Marv Goldschmitt
Adapso committee chairman

used the connector for its products." He added that Apple has not yet chosen a connection and is considering other devices along with Sony's.

Apple had begun working on a software protection device before the Adapso committee was formed. "Apple wanted to help software companies develop a method of copy protection," Christensen said. "We were aware of the problems [that]

some copy protection methods created for hard-disk system users."

A few months ago, Apple presented its work to the Adapso group. "We thought a number of manufacturers were addressing the problem of software protection," Goldschmitt said. "We were afraid that they would all build various models, and none would be compatible. The committee has helped to alleviate this problem."

Although the committee was impressed with Apple's design, it did recommend changes. "The committee thought that the Apple design limited the transmission speed from key to key ring," Goldschmitt said. "Although it would work fine with current products, it could create problems in the future. We also made other recommendations so it could support multiple-line protocols and data streams."

Christensen and Adapso committee members are modifying the design. "We should be left with one design that all manufacturers can work with," Goldschmitt said. He said he expects the modifications to be completed and placed in the public domain within two months.

Once the design is completed, vendors can manufacture software protection products. "There are a number of third-party companies interested in supplying software protection products," Christensen said. He expects these products could be available in the first quarter of 1986.

LICENSE from page 1

police existing software licenses and the red tape that micro managers face when placing a software purchase order. The organization's proposal, Gross explained, is the result of a recent MMA poll in which members noted the items they felt would make up an ideal license. The following are items from the poll to be in-

cluded in the position statement:

- The right to modify software for internal use, including serialization and the embedding of employee identification numbers. Such a feature would help MMA members keep track of software.

- The right to incorporate the vendor's software into a package that the firm is using internally.

- The right to receive regular no-

tification of enhancements, service, product bugs and fixes. The membership, Gross said, was unanimous on that stipulation.

- The right to have source code held in escrow. This, Gross explained, would benefit users in case the vendor went bankrupt.

- The right to documentation updates for all users on site.

- An end-to-copy protection for

software sold to corporations, which is another issue that Gross said had received complete support in the MMA poll.

The MMA decided to go public with the stipulations, Gross argued, because those are the points on which software vendors most often failed to act. Gross said he could point to no software vendor that performed adequately in all categories.

SIA files against Japan

WASHINGTON, D.C. — The Semiconductor Industry Association (SIA) last week charged that illegal barriers into the Japanese semiconductor market violate free trade rules, and the organization filed a complaint with the U.S. trade representative. The complaint charged that Japanese policies have continuously thwarted U.S. manufacturers in their efforts to penetrate the \$8 billion Japanese market.

The SIA complaint, filed under the 1974 Trade Act (Section 301), gives the Reagan administration, and specifically the U.S. trade representative, 45 days to decide if the charges have merit and if a formal investigation should be initiated. The complaint said that for 10 years, U.S. semiconductor manufacturers have tried to penetrate the Japanese market and have failed. It also said that U.S. market share has never climbed to more than 10%.

The SIA asked the Reagan administration to negotiate immediately with the Japanese government to obtain "prompt and dramatic improvement in U.S. sales in Japan," as well as to take steps to "prevent current and potential Japanese dumping of semiconductors in the U.S. market."

The SIA complaint renews U.S. industry pressure on the Reagan administration to take concrete action against the Japanese and reflects continuing frustration over the failure to establish a foothold in the Jap-

anese market. It comes at a time when the Japanese are capturing a large portion of the depressed U.S. market for high-technology products (see story page 12) and a large trade imbalance exists between the two countries.

The SIA said the U.S. held a 54% market share worldwide in semiconductors, which accounted for \$14 billion in sales in 1984. In Japan, U.S. market share was 11% and amounted to \$900 million in sales, while the Japanese held an 89% share and had \$7.1 billion in revenue. Worldwide, Japan accounts for 38% of the market, and its 1984 sales reached \$9.9 billion, the SIA said.

SIA's charges describe the dominance of a few large Japanese semiconductor firms — NEC Corp., Fujitsu Ltd., Toshiba Ltd., Hitachi Ltd., Matsushita Electric Industrial Co. and Mitsubishi Electronics Corp. — in the market, and the organization accuses these companies of engaging in "Buy Japan" policies.

The SIA said that policies of the Japanese government have contributed to U.S. difficulties in making sales by encouraging protection of Japanese firms.

The SIA cited a recent internal memorandum of Hitachi's that urged its U.S. distributors to "quote 10% below competition. If they requote, bid 10% under again. The bidding stops when Hitachi wins," (see story page 91).

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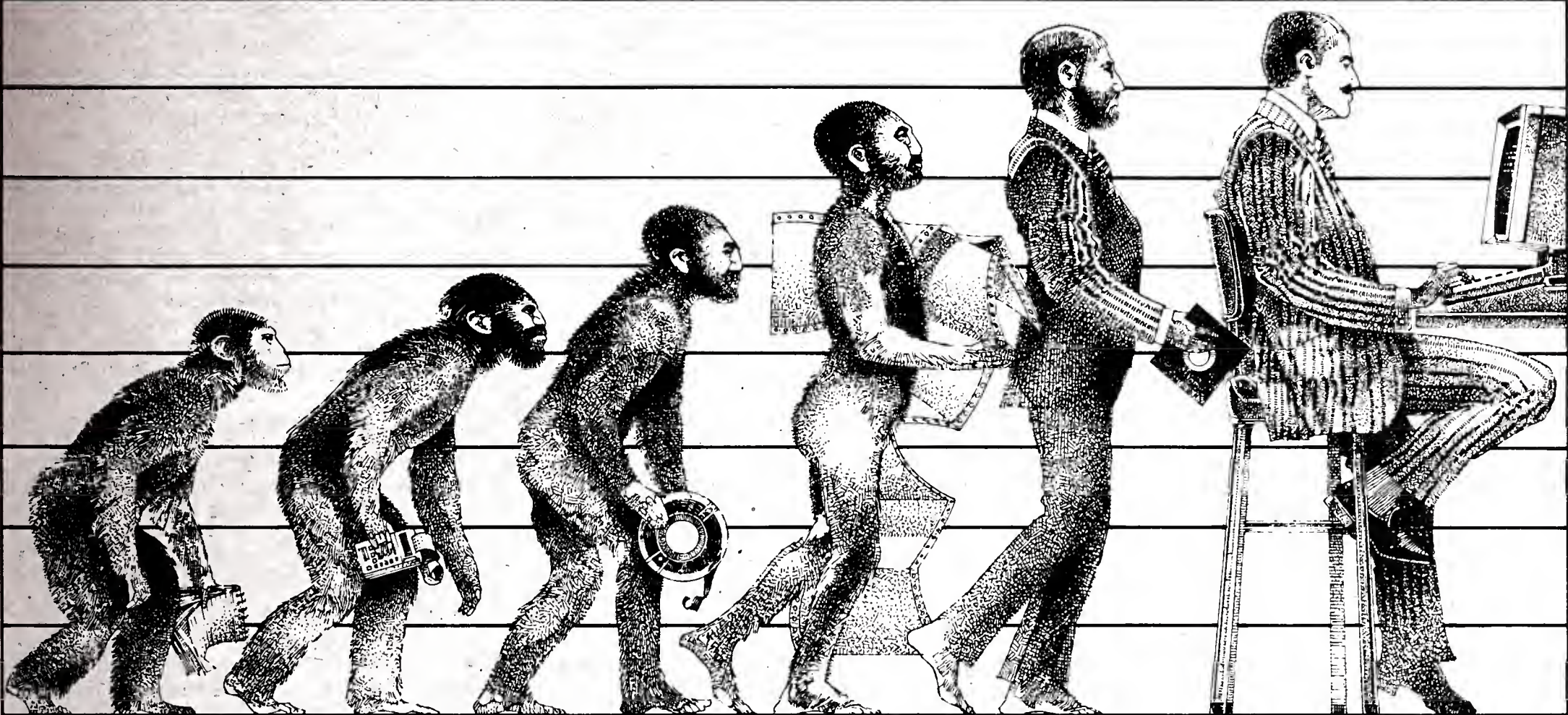
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NEWS

Smart buildings hold little or no interest for tenants

Tenants express little or no interest in shared tenant services, according to real estate brokers, but some service operators claim they have signed up most residents in their smart buildings.

"Shared tenant service is a buzzword more than anything else," said George H. Keller, a partner for Jones, Lang, Wootton, a real estate consulting operation in New York. "People aren't overwhelmingly inquisitive about it, but it is a topic of discussion."

In Boston, inquiries about shared services are not even on the list of questions prospective tenants ask about real estate, said Christopher Tosti, an agent with Leggat, McCall and Werner, a commercial/industrial real estate broker with offices in Boston and Washington, D.C. "They wouldn't think to ask about the services because they're not familiar with them."

Chicago is reportedly a major center for shared services. But Edward A. Laing, a senior associate with the real estate broker and development firm of Bennett and Kahnweiler, said, "I rarely have a request for that kind of facility. Tenants are primarily concerned with location, then price. Location is by far and away the No. 1 consideration."

Where there is a scarcity of office space, price can even outweigh the importance of location. "The big problem for your average tenant who is looking in the market in New York... is finding space he can afford," said Jeff Bernstein, an

agent with Newmarket and Co., a brokerage firm in New York.

All of the brokers contacted agreed that shared tenant services were simply a building amenity and, by themselves, would do little to attract tenants.

Companies that operate shared tenant services for building developers concede this fact. "I don't know of anyone that has signed leases simply because of shared tenant services, but I know the services have served as a final kicker to bring people into a building," said Bob Dammeyer, executive vice-president of management with Lincom Corp. Lincom is a subsidiary of Lincoln Properties, the second largest real estate developer in the country, and operates shared tenant services in eight of its parent company's buildings.

Dammeyer claimed 85% of the tenants in those eight buildings are using the shared services after a year of operation.

Tenants share telephone switching systems and long-distance telecommunications services. Lincom does not offer computer services or energy management support.

A spokesman for Sharetech, a company in Parsippany, N.J., formed by United Technologies Corp. and AT&T Information Systems to market and provide shared tenant services, admitted, "There has been slowness on the part of tenants to catch on to the idea of shared services." Share-

tech reportedly operates systems in 20 buildings and anticipates the addition of 30 more buildings by the end of the year. "I've heard it said that there is yet to be a tenant that will move into a building just because of shared tenant services," the spokesman said.

And while some tenants may inquire about shared services, there is no guarantee they will use them. "Some users look to see if a building may have these capabilities, but when they get into it, they realize it might be better to have their own switch and not rely on the landlord," said Keller of Jones, Lang, Wootton.

Idea must be marketed

Tosti of Leggat, McCall and Werner thinks that the market will have to be driven by developers. "I don't think you're going to find tenants suddenly wanting to move into smart buildings which developers then start building. I think developers will have to market the idea."

Developers themselves will shy away from actual involvement with the systems, preferring to bring in third parties like Sharetech, according to Keller.

"The business of most developers is bricks and mortar. If they feel they will have a better chance to sell or lease their space by putting in more embedded plant [such as equipment tenants can share], they will do so, but they will try to get an outside vendor to do it for them," he said.

— John Dix

SMART from page 1

would not use shared services if they were available in their building. The most frequently mentioned reason — cited 62% of the time — was that they already own equipment. Other reasons users cited were that shared services offer inadequate cost benefits (26%); alternative services that telephone companies offer are more appealing (21%); and shared service operators cannot match the reliability of the telephone company (18%).

While users and developers are equally tepid about shared services, they differ in how they would like these services provided.

There are three basic ways to offer shared services. With the in-house method, the developer buys and installs the necessary equipment and markets the service to tenants. Some developers prefer diluting their responsibility by entering joint ventures with independent service operators. Still others farm the task

out to a third party that takes on the risk and expense of the venture.

"Most users would prefer shared tenant services to be provided by their landlords," Rudov said, whereas the developers Telematics contacted said they are leaning toward the concession or third-party approach. "The concessionary approach is the most popular with developers because it affords the least involvement, the least risk and the least money up front," Rudov said.

A financial albatross

The risk can be substantial. Developers willing to shell out the capital for the necessary equipment have no way of knowing how many tenants will subscribe to the service. If fewer tenants opt for the service than are needed to cost-justify it, developers cannot make up the difference by raising their prices because this would encourage other users to jump ship, Rudov explained. It is thus impossible to calculate whether the in-

vestment will become a financial albatross.

While economically safest, the third-party approach to shared tenant services does not mean smooth sailing for the landlord. "Even though the [service operator] doesn't usually have a formal relationship with the landlord, if he makes tenants angry, the landlord is responsible," Rudov said. Developers that Telematics contacted noted the risk of getting involved with a third-party operator who later goes out of busi-

ness, leaving subscribing tenants high and dry.

"The biggest problem with this whole business is that vendors suffer from 'technologica erotica,'" Rudov said. "They assume that because the technology is there, the customers are going to turn cartwheels."

The Telematics study, called the U.S. Market for Shared Telecommunications Services in Multitenant Office Buildings, costs \$3,950.

Telematics is located at 277 Linden St., Wellesley, Mass. 02181.

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NEWS

NEGOTIATE from page 1

sive partner in a merger, as might be expected since the February announcement that its merger talks with ITT had been terminated, the union with Burroughs could mark the end of an era. Since 1951, the Univac product name has survived the merger of Remington Rand into Sperry Rand, Inc. in 1955 and the evolution to Sperry Corp. in 1979.

Analysts and users contacted by *Computerworld* expressed confusion about how the divergent product lines would eventually be merged. None of those contacted believed that any immediate steps will be taken to halt any product lines, and users said they hope the alliance produces a broader user base for the products of each company.

Although rumors of the discussions had surfaced earlier in the week, analysts and users reacted with surprise. "This is one [merger] that doesn't make a lot of sense," said Tom Linkas, an analyst with Goldman Sachs & Co. "The best both companies can hope for is to keep their installed base."

Dave Moschella, an analyst with IDC, noted the differing philosophies of the two companies. Sperry has ac-

tively sought a merger with other partners and was a major investor in Trilogy Ltd.'s effort to develop wafer-scale integrated semiconductors for a new generation of mainframes, he said. Burroughs, Moschella added, has been a "stalwart independent" that has resisted cooperative ventures, although it did acquire Memorex Corp. in 1982.

The two companies have established divergent strengths, Linkas said. Sperry is heavily involved in government contracts and, according to IDC figures, its share of the mainframe market has been slipping. Burroughs, however, has gained strength by re-vamping its high-end processor line in the past year, Moschella said.

Stephen T. McClellan, author of *The Coming Computer Industry Shakeout* and a vice-president with Merrill Lynch, Pierce, Fenner & Smith, declined to comment on the specifics of the merger but said it was an example of the trend to consolidate in the industry. A technological glut, the need for systems integration and a shift in emphasis from hardware to software "has produced a lot of upheaval, a lot of turmoil in the industry," according to McClellan.

One MIS manager operating equip-

ment from both companies said he was "amazed" by the news of the potential merger. "The two companies have totally different philosophies, especially in the operating systems area," said Jerry Allen Poe, MIS director with Hall's Motor Transit Co. in Mechanicsburg, Pa., which operates a Sperry 90/80 and a Burroughs B3900. "The Sperry philosophy is to run very close to IBM, but Burroughs' operating system is more user-friendly, though not as flexible."

Poe said he doubted there would be any immediate impact on product lines and that it could result in combined maintenance of both companies' products. He said his company has been considering replacing the Sperry machine with an IBM product but may reconsider if the merger goes through. "We might stay with them and become, essentially, a one-vendor shop," he said.

Howard Dix, manager of data services with the Orange County, Calif., administrative office in Santa Ana, Calif., operates three Sperry 1100/70 mainframes and said he would be concerned if the merger resulted in elimination of any Sperry products. On the positive side, he said, "We might be able to get

equipment more quickly if the merger expands Sperry's manufacturing facilities."

Similar concerns were expressed by Burroughs' customer Donald Silva, a data services manager with Sun-Diamond Growers of California in Stockton, Calif. "If they try to force us to change equipment or move to Sperry products, it could be a real problem," said Silva, who operates a Burroughs A-9 and a B6810. He added, "If they say convert, or [if] they introduce a new product line more closely linked to the Sperry philosophy, we will certainly explore

further than Burroughs and Sperry; we may even go to Big Blue."

Silva said the move could be positive, "depending on who becomes the controlling force." Similarly, John Jervinis, DP manager for the city of Waltham, Mass., said he would feel more confident about Burroughs after

a merger. "It would make Burroughs more secure as a company and allow [it] to offer more service and expertise," said Jervinis, who operates a Burroughs B1900.

This report was compiled by CW staff members Peter Bartolik, John Gallant and Tom Henkel.

IBM Entry Systems to split base between N.J., Fla.

BOCA RATON, Fla. — IBM announced last week that its Entry Systems Division (ESD), based here, will move a portion of its headquarters to Montvale, N.J., in July 1986 "to work closely on a day-to-day basis with other IBM headquarters."

Some 200 members of the ESD headquarters staff will be involved in the move, which signals continuing efforts to tie ESD's operations into overall IBM product strategy. ESD is the division that produced the successful Personal Computer.

ESD President William C. Lowe made the announcement and remarked that the division "has grown from a small business unit with a stand-alone product to a large division with products that are strategically significant to IBM's future."

Since midway through last year, IBM has taken several steps to bring ESD activities more in line with the those of the rest of the company. Earlier this year, IBM reassigned ESD founder Philip D. Estridge to a corporate staff position [CW, March 18].

Report to focus on productivity

What do DP and MIS managers need to keep their staffs productive and their software running efficiently?

Computerworld's August Special Report will examine this year's productivity tools and trends. It will focus on tried-and-true maintenance techniques and new technologies that managers are using to keep their organizations operating smoothly.

Contributions should take one of two forms: a tutorial article that discusses an issue or trend, or an application story that outlines a

particular user firm's experience with productivity tools.

Articles must be typed, double-spaced and must range in length from three to six pages. Artwork, such as charts, graphs and photographs, is encouraged.

Authors should include a brief biography and a telephone number at which they can be reached.

If you have a story to tell or questions to ask concerning the Special Report, contact Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

AT A GLANCE



1984 revenue — \$4.87 billion
1984 profits — \$244.9 million
Employees — 65,000
Worldwide installed base and market share of large-scale systems as of Jan. 1, 1985* — 1,451; 8%
Large-scale 1984 shipments* and market share — 339; 9%

* International Data Corp. figures

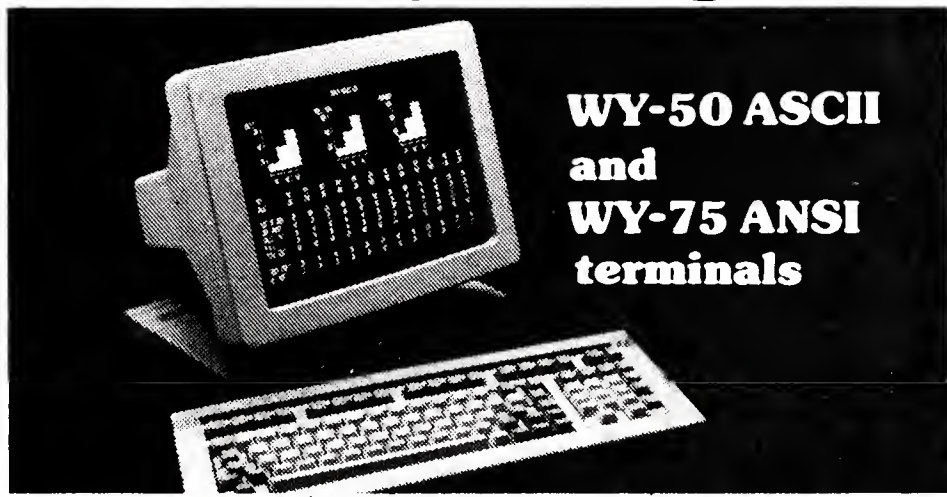
AT A GLANCE



1984 revenue — \$5.68 billion
1984 profits — \$286.7 million
Employees — 77,000
Worldwide installed base and market share of large-scale systems as of Jan. 1, 1985* — 924; 5%
Large-scale 1984 shipments* and market share — 119; 3.1%

* International Data Corp. figures

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NEWS

Consultant prescribes cure for medical center's DP ills



CW AT UCCEL

By John Gallant
CW Staff

DALLAS — The diagnosis was simple: The Queen's Medical Center Information Services Department in Honolulu had sacrificed control for productivity.

The bad news was not entirely unexpected, according to the department's director, Gordon Bruce, who had contracted with Uccel Corp. Systems Software Division's Consulting Services for a data center checkup.

Bruce, speaking at Uccel's Systems Software Conference users group meeting here last week, knew his department was understaffed. He was also painfully aware that his 42 staff members were working in a less-than-palatial environment, jammed into the basement of the 500-bed hospital. Queen's Medical Center, which has a staff of some 1,000 doctors and 2,000 other employees, was founded 125 years ago by Queen Emma and King Kamehameha IV of Hawaii.

But the department's past failures and the downturn in the health care industry had made it difficult for Bruce to get much sympathy, let alone increased funding, from the Queen's Medical Center board of directors, which tightly controls Information Services, he said.

In 1975, the board had mandated the implementation of a fully on-line patient management system. But by 1979 the system was still incomplete. That, Bruce said, prompted a restructuring of Information Services. Since 1981, a variety of major systems, including patient management, financial, information center and physician business applications, have been implemented. Work on nearly 20 other applications was also undertaken. But the speed with which Information Services transformed its operations exacted a toll in inefficiency and control.

Sought suggestions, analysis

Bruce asked Uccel's consultants for suggestions on trimming unnecessary costs and obtaining the resources to meet business plans. He also wanted an analysis of the strengths and weaknesses of the department and a comparison of Information Services performance with other data centers.

"Failures in the past had made it very difficult for us to get money from the board," Bruce said. "We were hoping the Uccel study could help us swing the pendulum in the other direction."

The Information Services department operates an IBM 3083B mainframe under MVS that supports 150 terminals and 100 linked micro workstations. Its on-line systems handle roughly 300,000 transactions and 500 batch jobs daily. Over a span of 2½ days, Uccel consultants conducted a variety of studies on the data center's operations.

According to a Uccel representative, the one-CPU data center checkup cost roughly \$9,000. It

included a review of such objective measures as hardware utilization and performance, Dase performance, production and test work loads and exception handling. Consultants also reviewed the department's standards and procedures and conducted personnel interviews and work flow analysis, among other things.

At the conclusion of the checkup, which also gave Bruce a look at how his shop's performance measured up to other data centers across the U.S., Uccel consultants outlined more than 30 major problems and recommendations for solving them. The problems ranged from poor tape management to understaffing to the need for IBM CICS tuning.

"I was certain they would not tell me anything I did not already know," Bruce said. "But there were surprises. The data center checkup provided me with the information I needed to restructure our organization."

Bruce is currently at work implementing Uccel's recommendations, and he said he feels he has greater support from upper management. "The third-party objectivity gave us more leverage with management," he said. "In addition to helping me manage better and address new issues, it has helped us get more money and more recognition for the work we do."

Now that he has seen how Uccel conducts a data center checkup, could Bruce undertake one of his own? "We already do parts of the checkup on our own. That helps us stay on track," he said. "But you really need that objective opinion and the interpretation of the findings."

UCCEL from page 1

agement functions. One such component, the Nova:Save PC Data Protection Facility, was introduced along with the Synova series concept and Nova:Log last week.

Product-level integration

According to the spokesman, most of Uccel's current line is integrated at the product level, meaning that packages have certain limited, predefined interfaces. The Synova series reportedly is designed to allow for full in-

tegration of the packages by providing a layered architecture through which all commands and requests for data are controlled.

The spokesman said Uccel is currently developing the remaining modules that will allow its current products to operate within the Synova environment.

The first layer of the architecture, Nova:Log, scheduled for September availability, will provide for a single logon point to all systems products. It is said to manage multiple product sessions

without intermediate logon/logoff and it preserves the context of an incomplete session while other sessions are being conducted.

The spokesman said it provides a single point of access to any IBM Vtam application and allows users to move easily between applications. Nova:Log has an introductory price of \$18,500.

Facilitates backup

Nova:Save is designed to facilitate the automatic backup of data stored on an IBM Personal Computer hard disk. The micro must be equipped with Digital Communications Associates, Inc.'s Irma board and must be connected to an IBM mainframe under MVS/CICS.

Nova:Save automatically

saves micro data to a mainframe disk on a timed basis, the vendor said. The product is available immediately at an introductory price of \$9,500.

According to Maria Smith, vice-president of marketing with the Systems Software Division, "Synova represents a new approach to a controlled environment for IBM shops."

"Systems software products, whether from one vendor or many, have always had unique features, such as different command structures. They were automated but not integrated. Synova is the architecture that will integrate all our products into a total environment."

According to Paul Newton, senior vice-president of soft-

ware products, the first Synova products are the result of a nearly two-year research and development effort.

Future announcements

He said other components of the Synova series, such as the command and communications facilities, will be announced later this year and in early 1986. He said Uccel's own offerings will be augmented by upcoming product acquisitions, some of which are currently in the works.

"We have been building an integrating technology," Newton said. "The real world is demanding integration and we are launching products based on that demand."

Uccel is located at Uccel Tower, Exchange Park, Dallas, Texas 75235.



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Intel eyes further cost cuts, layoffs

SANTA CLARA, Calif. — Intel Corp. confirmed last week that it is considering further cost-cutting actions, including additional layoffs, due to the continued sales slump in the semiconductor industry.

According to Intel spokeswoman Glynis Kaye, the semiconductor manufacturer is "looking at all kinds of options," including layoffs, temporary shutdowns and plant closings.

The company is "drafting contingency plans" in the event that the slump continues. "Business still is definitely down," she explained.

'A lot of rumors'

Asked about reports that within the next two weeks the company will announce layoffs of from 12% to 15% of its work force, Kaye said that "a lot of rumors are going around" and that final plans have yet to be formulated.

Earlier this year [CW, Feb. 25], in its first layoff since 1974, Intel said it was dismissing 900 workers, or 4% of its work force.

That action included dismissal of 500 workers at Intel's systems and components division in Hillsboro, Ore., and 100 at its Phoenix manufacturing plant.

Test facility phased out

Also included was the phasing out of a components test facility in Santa Cruz, Calif., and workweek reductions for wafer fabrication plant employees.

Also last week, the Semiconductor Industry Association (SIA) revealed that average monthly orders for semiconductor sales in March through May were down 57% from the same period in 1984 and down 9% from the February through April period.

Shipments of semiconductors in 1985 will be 20% below the 1984 level, the SIA predicted.

NEWS

User warns against using multiple data dictionaries



CW AT UCCEL

By John Gallant
CW Staff

DALLAS — When David James asks other users how many data dictionaries they have in place, they are often puzzled by the question.

After pondering for a moment, those users are likely to reply, "Why, one, of course."

To that, he responds, "Are you sure?"

According to James, data administrator for Riggs National Bank, the largest bank in the Washington, D.C., area, users often have a variety of dictionaries operating — even though they may think all their data is under the control of one central system.

Speaking on the future of data dictionaries at Uccel Corp.'s Systems Software Conference users group meeting here last week, James said many software products, especially fourth-generation or information-center-type systems, contain their own dictionaries.

James listed Information Builders, Inc.'s Focus, Martin Marietta Data Systems' Ramis, Applied Data Research, Inc.'s Roscoe and Artificial Intelligence Corp.'s Intellect as examples of software boasting built-in data dictionaries of one type or another.

"Those dictionaries come in many guises," James said. "But they all specify a file definition in front of a file. What you wind up with are a lot of dictionaries in a lot of different products. You end up with many dictionaries, whether you want them or not."

To ensure data control and integri-

ty in an environment of multiple dictionaries, James cautioned, users should centralize their "metadata" — the data about their data. The primary data dictionary, he said, should be linked to all others so it can act as a central directory of data definitions and their locations. At Riggs National Bank, James said, Uccel's UCC-10 dictionary under IBM's IMS performs that task.

"The [central] dictionary should interface directly or via a link to each and every information resource," James said. "There should be one source of control over all the data dictionaries. The main dictionary needs to know what other dictionaries do and what is contained in them. Without that control, you will have multiple data definitions and may be required to do multiple updates."

Cautioned against overloading

James said no new application or information-center-oriented data base extract should be brought online without a link to the main data dictionary. But he also cautioned users against overloading the central dictionary.

"There is no sense in trying to load all other data dictionary information into the main dictionary," he said. "The central dictionary should just point to where the definitions lie in the other dictionaries. Make the main dictionary your reference library."

According to James, data dictionaries in software products fall into six main classes:

■ The active dictionary, which ensures that programs and the data base management system will not function unless data definitions are recorded in it.

■ The passive dictionary, which maintains data descriptions and usage information but does not drive programs or DBMS.

■ The dependent dictionary, which relies on other software, such as a DBMS or operating system, to run.

■ The independent, or stand-alone, dictionary that is able to run on many systems.

■ The logical dictionary, in which the business functions of a corporation are defined from a user perspective. This dictionary provides a business view of data, James said.

■ The physical dictionary, in which program I/Os and DBMS controls are defined. This class of dictionary provides an applications view of data.

In the future, James said, many organizations will migrate to what he called a "human data dictionary," which will maintain data definitions in common user terms. "The dictionary of the future will know what users are saying," he said. "It will be driven by another data dictionary that links the user definitions with the required DP definitions."

REPORTER'S NOTEBOOK

Ramblings from the floor at Uccel Corp.'s Systems Software Conference users group meeting last week:

■ Was it just coincidence that Computer Associates International, Inc. (CAI) unveiled its CA-Unicenter [CW, June 10] system just one day prior to Uccel's introduction of its Synova series software? The announcements appear to signal a convergence of strategies on the part of systems software vendors.

Paul Newton, senior vice-president of software products with Uccel, said CAI's strategy of linking users through CA-Unicenter to CAI's Jericho, N.Y., headquarters was a good idea but one that Uccel was not, at least for the time being, planning to embrace.

Asked about the earlier availability of the full CAI system, Newton responded, "They are saying, 'Here it is right now.' We are saying, 'Here is this portion for right now, and there will be a lot more to come in the future.'"

Newton said that, despite the moves toward product integration on the part of the leading systems software vendors, there will always be a place for exceptional, stand-alone systems packages. But, he added, those vendors that want to remain major players in the industry will have to integrate their



CW AT UCCEL

products eventually.

■ Prior to the press briefing on the Synova series software, one senior Uccel official commented that applications pricing

is something the Dallas-based software and services company is monitoring carefully. The remarks came in the context of a discussion on rumored price wars between applications vendors that, some industry observers claim, are cutting prices by as much as 75% to outbid competitors. In many cases, the official said, software prices are artificially high and may change dramatically in the future.

■ General session speaker Jack Jackson, a noted lecturer on strategic planning, chided Uccel about the hoopla surrounding the company's announcement of its Synova series software to the more than 1,300 users in attendance. Actually, Jackson's good-natured jabs were aimed at software vendors in general that, he said, tout their products as panaceas that can transform even the most problem-riddled manager into a "leading-edge executive."

Jackson also took more than a few whacks at airline companies for failing to prepare for the forces currently restructuring that industry and for neglecting to use DP resources to get immediate feedback on the implementation of their strategies.

DP security course set for July

SANTA CLARA, Calif. — A three-day course, "Recent Advances in Computer Security," is scheduled for July 16-18 at the University of California Extension Conference Center here.

The course is intended for security managers and others interested in computer security issues. It will provide an overview of computer technology and discuss recent advances

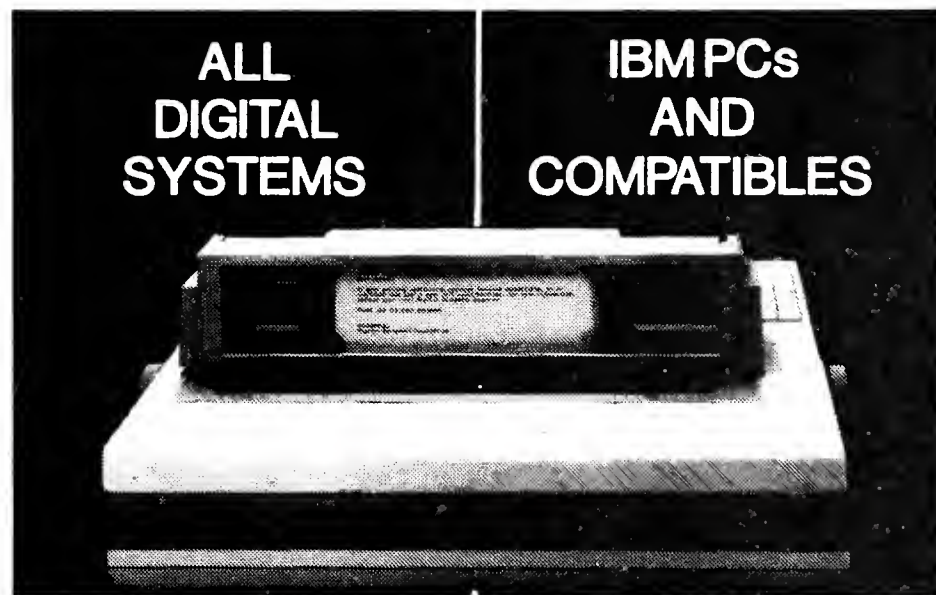
in security products.

James Arlin Cooper of Sandia National Laboratories will conduct the course. He is adjunct professor of electrical engineering with the University of New Mexico at Albuquerque.

The registration fee is \$645.

University of California Extension Center is located at 2223 Fulton St., Berkeley, Calif. 94720.

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NEWS

Technology advances to propel AI into micro arena



CW AT
FUTURE COMPUTING

By Eric Bender
CW Staff

DALLAS — As artificial intelligence technology spreads from research and development into the real world, what role will be played by the personal computers now found on millions of desktops?

"If AI is going to happen, the bulk of the applications will be on personal computer-type machines," predicted David Squire, AI program manager at Tektronix, Inc.

Speaking last week at the Future Computing, Inc. Forum on AI and Personal Computers here, Squire said that near-term hardware advances, including microprocessors optimized for AI applications, will accelerate AI's move into the micro arena.

"AI-optimized general [microprocessors] will exceed the performance of customized AI processors now," Squires forecast. "We think that will happen within 1½ to two years."

As one example, Squire said, during a recent trip to Japan he saw a demonstration of a Motorola, Inc. 68000 coprocessor plugged into a NEC Corp. personal computer "that runs Smalltalk with about the same performance as a [Xerox Corp.] Dolphin."

AI-optimized chips will begin filtering into personal computers as add-on boards within about a year, said Future Computing chairman Egil Juliussen. "In the 1987-1988 time frame, we see them built into the product," he said, speculating that about half the personal computers shipped might be so equipped.

However, "It's a lot easier to have [personal computers] embedded inside AI machines," said Beau Shiel, product development manager at Xerox Artificial Intelligence Systems.

Optimized to handle resource-intensive tasks, such as function calls and "garbage collection," AI machines may keep standard micros off their turf longer than did dedicated systems for other uses such as computer-aided design, according to Shiel.

Current AI machines typically offer at least 2M bytes of internal mem-

ory, high-resolution graphics, "a reasonable amount of raw speed and a significant size of virtual memory," Shiel said. "Some of this is just luxury, but not all of it," he said.

While many expect widespread use of microcomputers as AI delivery vehicles, Shiel pointed out that "a lot of AI applications are as demanding in their machine resources as the development effort [is]."

Although personal computer hardware is evolving rapidly, "It's clear today that the power isn't there," said Jim Spoerl, group manager for product marketing at Symbolics, Inc. in Cambridge, Mass.

However, Spoerl added that he considers personal computers a "major factor in continuing the advance

of AI into the real commercial world." Suitable roles will include training, delivery of small AI applications as stand-alone machines and acting as workstations on distributed networks, he suggested.

Meanwhile, other vendors insisted that AI software can do useful work on personal computers today. Paul Robertson, president of Artelligence, Inc., claimed that his firm's implementation of Digital Equipment Corp.'s OPS5 language allows applications to run as quickly on an IBM Personal Computer XT as they do under OPS5 on a DEC VAX.

"The barrier is not the computational power," Robertson said. "With improvements we see in the pipeline, I don't think that's critical."

REPORTER'S NOTEBOOK



CW AT GOVERNMENT
COMPUTER EXPO '85

Ramblings from the floor of last week's Government Computer Expo '85 in Washington, D.C.:

■ The exposition's keynote speaker urged government DP managers to be more cost-conscious when buying computer hardware and software to avoid the bad publicity on overpricing that has been hitting the Pentagon and its contractors. Maj. Gen. John T. Stihl, the U.S. Air Force's assistant chief of staff for information systems, said that if government managers can build up their credibility with the public, Congress and the White House, the problem of overregulation of computer procurement will be reduced.

■ Stihl also strongly urged government DP managers to evaluate user requirements for information before acquiring computer systems, in part to avoid giving decision makers a case of information overload. "In this world of ever-expanding requirements, we should think about what psychiatrists tell us: Decision makers, under pressure, discard information, avoid bringing in more information and stop exploring new alternatives," he said.

Consequently, he noted, "Information technologies that tend to inundate decision makers with useless data are not a positive influence."

■ The use of integrated software for microcomputers apparently is popular among bureaucrats. In a special program, the 500-member

Integrated Software Federal Users Group sponsored workshops on government-oriented applications of inte-

grated packages and in-depth discussions of such products as Lotus Development Corp.'s Symphony.

■ U.S. Rep. Charles Rose (D-N.C.) was one of four people awarded the *Government Computer News* Annual Award for Excellence at the exposition. Rose, who reportedly uses an Apple Computer, Inc. Macintosh, was cited for encouraging other members of Congress to use microcomputers in their offices. He is chairman of the House Subcommittee on Office Systems and founder of the Policy Group on Information and Computers.

Other award winners were James H. Burrows, director of the Institute for Computer Sciences and Technology; Donald J. Herman, executive vice-president of NCR Corp.; and Joseph R. Wright Jr., deputy director of the U.S. Office of Management and Budget.

■ The exposition had a long list of sponsors, all with long names: the Federation of Government Information Processing Councils, the Graduate School of the U.S. Department of Agriculture, the National Association of State Information Systems and the Information Resources Administration Councils. In a letter from the White House, President Reagan sent best wishes to them all.

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EMA conference slated for Sept. 4

WASHINGTON, D.C. — The Electronic Mail Association (EMA) has announced that a conference, "Electronic Mail and Messaging: A Preview of the Next Decade," will be held Sept. 4 at the Mayflower Hotel here.

Discussion will include the X.400 international standards, which have been ratified by the Consultative Committee on International Tele-

phone and Telegraph. Speaking will be Sen. Patrick J. Leahy (D-Vt.), a congressional leader on computer privacy and security issues.

The chairman of both the conference organizing committee and the EMA is Richard W. Coughenour.

The registration fee is \$175. EMA is located at Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

NEWS

Firms in 'embryonic' AI mart pin hopes on growth



CW AT
FUTURE COMPUTING

By Eric Bender
CW Staff

DALLAS — Although real-world applications of artificial intelligence technology are increasing rapidly, "the business is extremely embryonic," said Ralph Kromer, president of Intellicorp in Menlo Park, Calif.

"We're really in the technology transfer business," Kromer remarked at a Future Computing, Inc. conference on AI and personal computers here earlier this month. "We have to provide a considerable amount of training, consulting and applications support, and we can't tolerate very many failures."

No AI software firm has reached \$10 million in annual sales, and "we're all fighting for survival," Kromer commented.

Other speakers at the Future Computing meeting also underlined the industry's immaturity. "Most of us in this market are in a cascade of vendors, all selling to each other," said Beau Schiel, product development manager at Xerox Artificial Intelligence Systems in Palo Alto, Calif.

"This isn't an industry so much as a bunch of hardware and software technology trying to get to the market," said Tim Williams, senior analyst at Future Computing. Among Fortune 1,000 firms, "even those who are spending hundreds of thousands or millions of dollars are just beginning to come out of the prototype stage."

But the conference presentations emphasized the AI market's tremendous long-term growth potential as well. Kromer noted that the installed base of system licenses for Intellicorp's Knowledge Engineering Environment product, which stood at only 40 last September, has doubled or better in each succeeding quarter.

Art Beane, manager of product management at Digital Equipment Corp.'s Artificial Intelligence Group, estimated that the value of the AI market will rise from \$30 million in

”

'Most of us are in a cascade of vendors selling to each other.'

— Beau Schiel
Xerox Corp.

1983 to between \$190 million and \$300 million this year and between \$720 million and \$11 billion in 1990.

"I can count over a thousand applications being developed by companies for vertical markets," said Larry Geisel, president of Carnegie Group, Inc., a Pittsburgh-based software vendor. The aerospace, automotive,

electronics and defense industries "are all making major, major commitments to AI," he said.

Among hardware advances that will help to drive the market for resource-hungry AI applications, executives said, are 32-bit general-purpose microprocessors, multiprocessor architectures, 1M-bit

random-access memory chips and very large-scale integration processors customized for AI applications.

One example of upcoming AI silicon is a 32-bit chip being developed by Texas Instruments, Inc. that executes Common Lisp, designed as a functional replacement for the company's Explorer machine and funded by the U.S. Department of Defense's Defense Advanced Research Projects Agency, noted Joe Watson, TI's vice-president for digital systems.

The experts also sounded a general note of caution against raising customer expectations too high. "What I fear the most are exaggerated product claims," said Future Computing Chairman Egil Juliussen.

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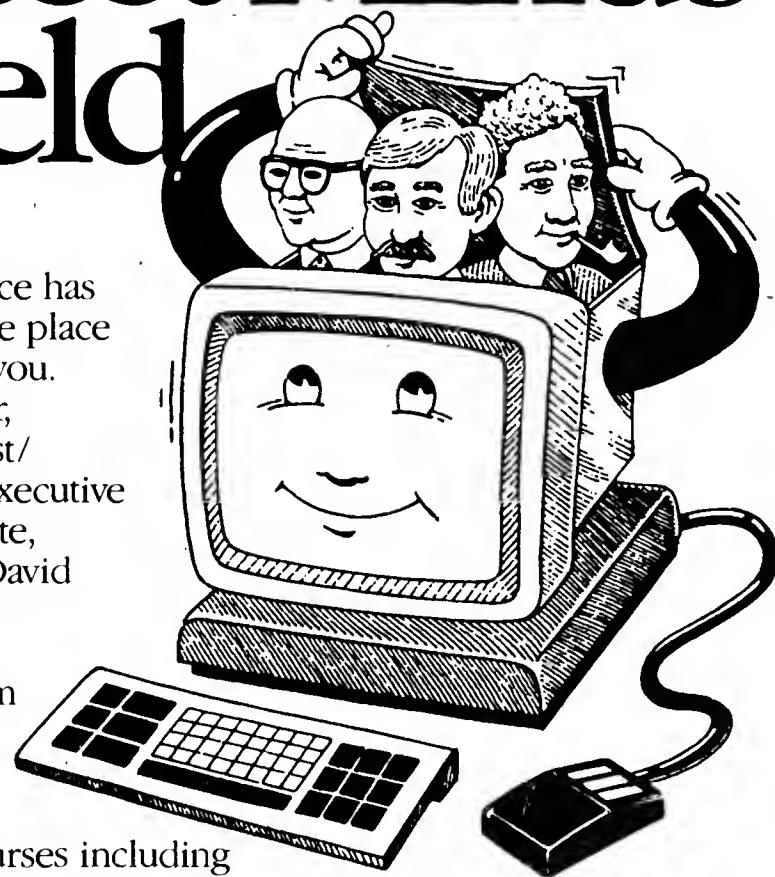
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Simulation meet planned for July

CHICAGO — The Society for Computer Simulation is sponsoring the Summer Computer Simulation Conference July 22-24 at the Westin Hotel here.

The keynote address, "Computer Simulation and the Demand Reality," will be given by Edward E. David Jr., president of Exxon Research and Engineering Co. in Annandale, N.J. There are a number of full-day sessions scheduled on several topics.

Registration for the conference costs \$175 for society members and \$200 for nonmembers. Additional fees are \$400 for the expert system seminars and \$150 for the panel discussions. The Society for Computer Simulation can be reached through P.O. Box 17900, San Diego, Calif. 92117.

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NEWS

Kurzweil introduces word recognition peripheral

KVS 3000 vocabulary includes 1,000 words

WALTHAM, Mass. — Kurzweil Applied Intelligence, Inc. last week announced a programmable computer peripheral, or board-level device, that reportedly recognizes up to 1,000 spoken words with an accuracy of approximately 95%.

Marketing Director Robert Joseph said the Kurzweil Voicestream 3000 (KVS 3000) can be used in data entry applications, for command of financial and word processing software and for medical and insurance form reporting.

Joseph said Xerox Corp. and Wang Laboratories, Inc., both investors in the Kurzweil speech recognition enterprise, may market the KVS 3000 along with their own systems. No final agreement, however, has been reached with the two companies, he said.

Compares words with speech tokens

The KVS 3000 is said to compare words spoken into a microphone with a memory of 3,000 sample speech tokens. To program the memory, a user types in 1,000 chosen words. In response to prompts, one or more users then repeats each word into the machine three times.

At that point, the programmed memory will contain 3,000 speech to-

kens, three for each word. The machine displays the utterances in its memory that most closely match the spoken words. The word recognition process takes an average of 50 msec, the vendor said.

The KVS 3000 is scheduled for third-quarter availability. Shipments to beta users are scheduled for this month, a spokesman said.

Increments of 3,000 tokens

The KVS 3000 reportedly can be expanded in 3,000-token increments to a total of 15,000 tokens by adding more memory boards. The expanded configuration offers a total of 5,000 words of speaker-dependent recognition, enough vocabulary to support limited text dictation applications, according to the vendor.

The KVS 3000 is available either as a board set for use with host systems compatible with Intel Corp.'s Multibus or as a self-contained 18-lb desktop package with RS-232 output, a spokesman said. The KVS 3000 will also be offered with Microsoft Corp.'s MS-DOS software for standard microcomputer systems, Kurzweil said.

The product includes three boards: an audio processor for handling analog signal conditioning and analog-to-digital conversion, a pattern processor that stores acoustic patterns and provides real-time recognition processing and a speech processor for coordinating the activities of the audio

and pattern processor.

The hardware is said to include a Motorola, Inc. 68000 microprocessor, 640K bytes of random-access memory for program and data storage and the company's programmable digital filter chips, which aid the signal processing and conditioning task, according to Kurzweil.

Adapts to user speech patterns

The system's software is designed to adapt itself to a user's speech patterns, with improved performance over time. The system reportedly continues to collect samples of speech during actual work.

The company refers to the KVS 3000 as a building block for a 10,000-word speech-to-text system, which is scheduled for delivery in the fourth quarter of 1986. The company said that there are distinct differences between voice recognition and speech recognition systems.

A voice system discriminates between words but not homonyms. A speech system, however, has linguistic software that recognizes homonyms and punctuation, Joseph said.

Word recognition vs. speech recognition

The 10,000-word Voicestream will be a word processing system, but the KVS 3000 is a word recognition system and not a speech recognition system. Joseph said the average executive can meet 98% of letter- and report-writing needs with a 10,000-

word vocabulary. Shakespeare, he said, used 39,000 words in all his writing.

The KVS 3000 is sold as a self-contained package with RS-232 interface for \$6,000. With the IBM Personal Computer XT or AT interface, the price of the package is \$6,500. As a Multibus-compatible board set, the system sells for \$5,000, with discounts for OEMs.

Additional memory boards with a 3,000-token capacity each will be sold for \$2,000 each, or \$3,000 each in a package with RS-232 output. The additional boards are scheduled for fourth-quarter delivery.

Kurzweil is located at 411 Waverly Oaks Road, Waltham, Mass. 02154.

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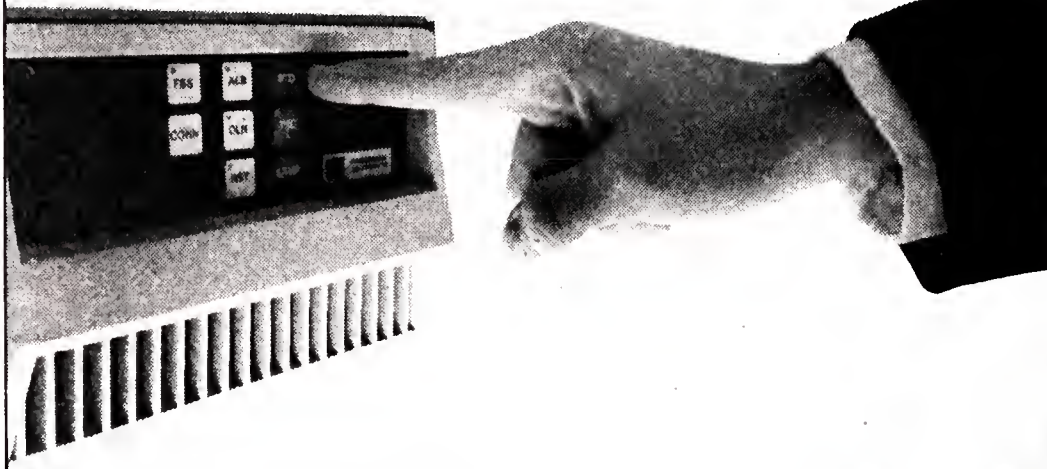
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Poll finds DP hiring up

CLEVELAND — Job seekers in data processing should expect their chances to improve moderately in the second half of this year, according to a recent poll by Management Recruiters International, Inc., a recruiting firm here.

The survey found 41.7% of the 436 firms polled would increase their hiring in the next six months. For the first six months of 1985, an earlier poll taken by the same firm had found 35.8% of respondents expected to increase their hiring, a projection 5.9% less than the current one.

Only 7.1% of the latest poll's respondents said they would decrease hiring, while 50.7% said they would maintain their current levels, Management Recruiters said.

As for which areas of the country will do best, the poll singled out the South Central states, including Georgia, Alabama and Tennessee, and the North Central states, including Illinois, Wisconsin, Ohio and Michigan. Fifty percent of the companies responding from the South Central region said they would increase their data processing staffs.

When the responding firms were grouped by industries, the winners — those firms that would increase their hiring — were the electrical industry and the transportation and communications sectors.

The losing firms were the construction, lumber and wood, fabricated metal products and machinery industries.

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NEWS

U.S. agency faces probes, boosts security after audit

Interior questioned lottery procedures

By Mitch Betts
CW Washington Bureau

Computer security is being strengthened at the U.S. Bureau of Land Management's (BLM) computer center in Denver, following an internal investigation that indicated inadequate controls could jeopardize the integrity of the BLM's computerized lotteries for oil and gas leases.

In March, the inspector general of the U.S. Department of the Interior issued an audit report citing the Denver Service Center for inadequate

controls over passwords, a lack of audit trails and faulty operating procedures.

Because of the inadequate security, the Office of the Inspector General reported that it could not vouch for the integrity of the BLM's computerized lottery and could not determine whether the lottery had been manipulated to favor certain energy companies, the audit said.

In response, Bobby Hooker, the BLM's computer security officer in Denver, said, "We're developing stricter management features to better control access to the system." He indicated that the stricter controls cover audit trails, passwords and access to the system.

Questions about BLM's computer security surfaced last October when the BLM awarded drilling rights on federal land tract W-698 in north-eastern Wyoming to Seco Energy Corp., the same firm that had requested that the tract be included in the lottery. The bimonthly lottery is supposed to pick winners at random.

The Federal Bureau of Investigation, the Interior Department and the U.S. House of Representatives' Committee on Interior and Insular Affairs reportedly are investigating the lottery to determine whether Seco's win was a coincidence or not.

The inspector general's audit concluded that, "because of poor internal controls and the lack of audit

trails in the automated process, we could not prove that the [lottery] system was manipulated to the benefit of one or more applicants. However, because of the same weaknesses and other deficiencies, we do not have confidence that the [lottery] was not manipulated."

The audit, conducted in November and December, cited the following problems:

- Passwords for most leasing programs and data were changed only once in the past year. Also, passwords, when entered at a VDT, were not automatically deleted or rendered illegible, thus allowing unauthorized persons to obtain them through observation.

- Keywords used to access the most sensitive computer programs also were not changed frequently or periodically. "Responsible personnel informed us that the last date of change was unknown but estimated the keywords had not been changed

”

Because of weaknesses and other deficiencies, we do not have confidence that the [lottery] was not manipulated.

— U.S. Department of the Interior
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in the last two years," the audit said.

- The computer center did not use the system's activity log as an audit trail, and no one was assigned to monitor the activity log for irregular or suspicious activity. The random number assigned to the lottery winner was not kept for confirmation.

- Computer programs and subsequent changes to them have not been documented. Also, there was no validation testing of the random-number algorithm in the last five years, prompting doubts about the randomness of the numbers generated.

- The "computer files were accessible and could easily be displayed by any user of the BLM computer system. This feature of the system further reduces confidence that the [leasing] programs and data files are free from unauthorized use or manipulation," the audit said.

- Computer programmers develop and test computer programs for the lottery in the same working area as the computer running the lottery. This could result in the wrong computer program being executed in the lottery, the audit said.

Hooker said the BLM is implementing the security improvements recommended in the audit report. He declined to discuss the additional security measures.

Other BLM officials said the reforms include changing the password at least four times a year, ensuring that passwords are not displayed on the VDT screen and monitoring an audit trail. However, documenting the computer programs will be difficult, according to Delmar D. Vail, director of the Denver Service Center, because of problems in recruiting qualified workers to do the job.



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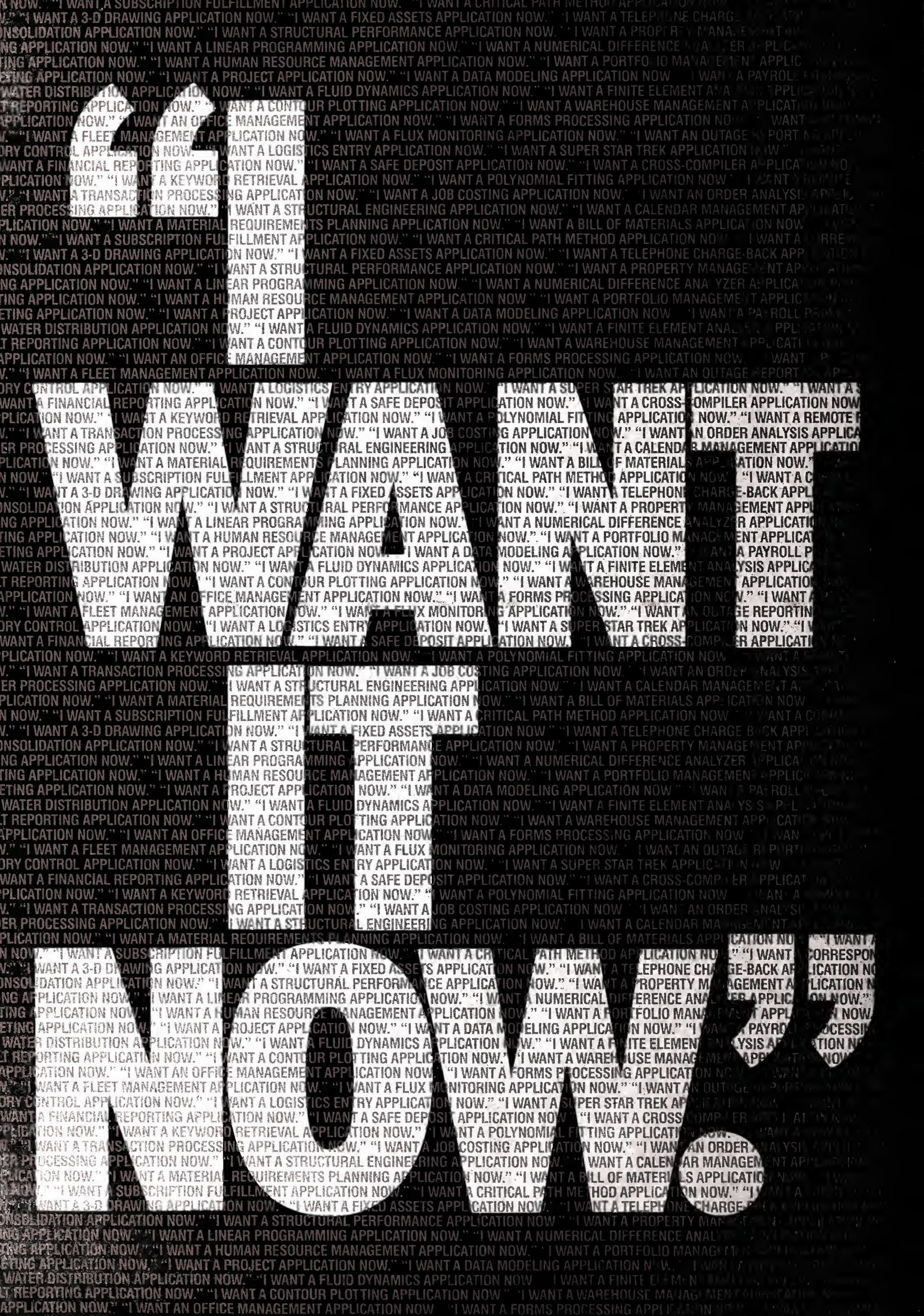
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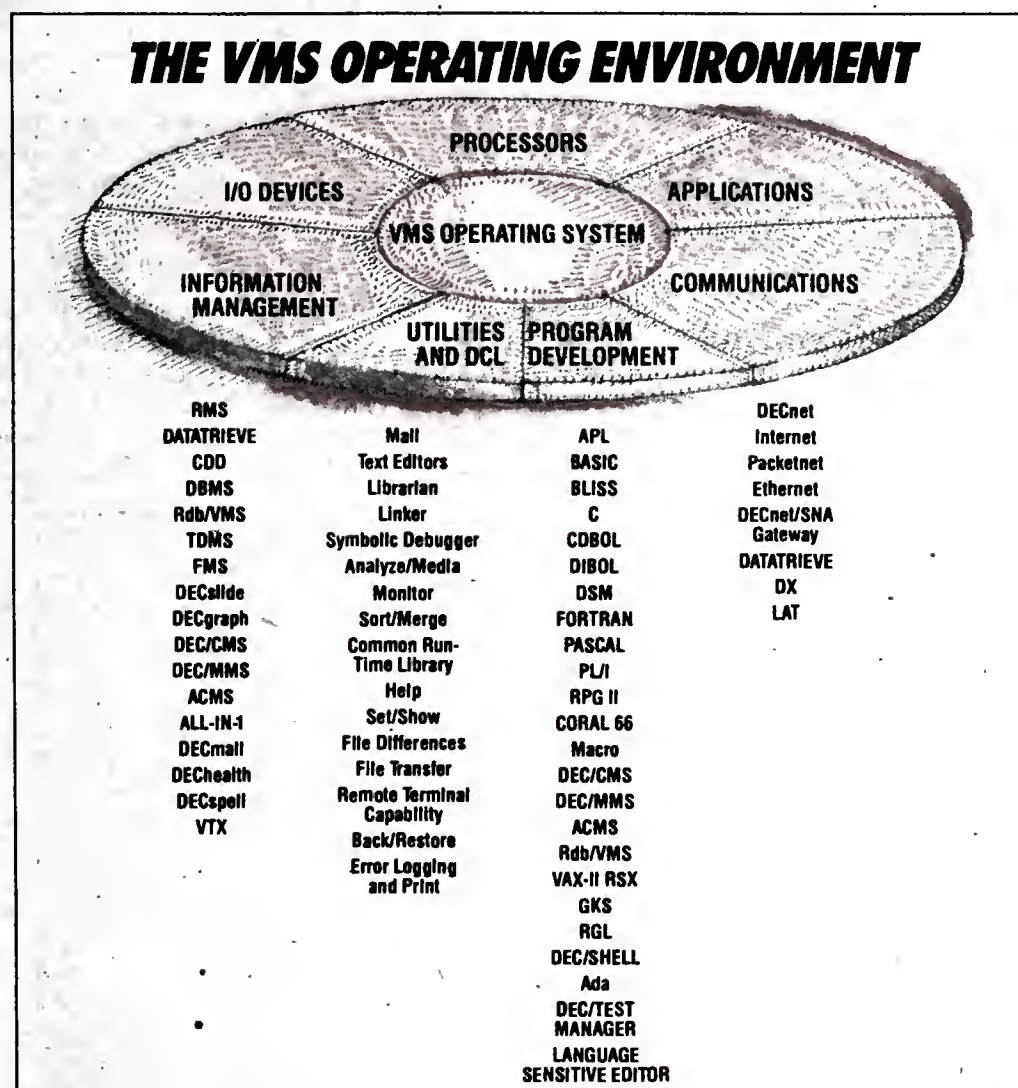
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NEWS

Congress ponders ban on sales to South Africa

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The U.S. Congress is on the verge of passing legislation that would ban the sale of computers, computer parts and software to South Africa's government. The legislation is part of a package of economic sanctions against that country's apartheid policy.

The U.S. House of Representatives and the Senate Foreign Relations Committee already have passed slightly different versions of the legislation. Sometime before Congress' July 4 recess, the Senate is expected to approve the committee bill, according to Claude Allen, spokesman for the Senate panel.

Section 7 of the House bill (H.R. 1460) states: "No computers, computer software or goods or technology intended to service computers may be exported, directly or indirectly, to or for use by the government of South Africa or any corporation, partnership or other organization which is owned or controlled by the government of South Africa."

Certain exemptions

The provision does not apply to donations of computers to primary or secondary schools. The bill levies stiff penalties on violators, including a \$1 million fine for businesses and a five-year jail term for company officials.

The House legislation, which also bans new investments in South Africa by U.S. businesses, was approved June 5 by a 295 to 127 vote.

Rep. Howard L. Berman (D-Calif.) is the author of the computer export ban in the Anti-Apartheid Act of 1985. Berman said U.S. companies supply 70% of the computers sold in South Africa and argued that these computers help the government to enforce its racial policies.

Take computers out of their hands

"The only way that we can ensure that no American computers are used to enforce apartheid is to take computers out of the hands of all South African government agencies," ac-

cording to Berman.

Berman said that detailed dossiers are kept on South Africa's blacks to monitor their movements and activities. "Computers are used to collect, retrieve and employ this information in the repression of those who fight to eliminate apartheid," he asserted.

The Senate Foreign Relations Committee's bill (S. 995) has a somewhat more limited scope than does the House bill. S. 995 bans the sale of computers and software to those agencies of South Africa's government that enforce apartheid. The committee approved the bill on June 4 by a 16 to one vote.

Rep. Berman, opposing this approach, said it would be fruitless to try to distinguish between "good" and "bad" agencies. "Many [computers] have been purchased through the government's central purchasing agent, the State Tender Board. It is all but impossible to track the use of an American computer once it has been sold to the central purchasing office," he said.

Cbema supports Senate bill

The Computer and Business Equipment Manufacturers Association (Cbema), based here, supports the Senate approach and strongly opposes the broader House bill, according to Cbema spokeswoman Charlotte LeGates.

She said that S. 995 correctly limits the ban to the apartheid-enforcing agencies that need to be sanctioned. The House bill, on the other hand, is too broad, will have no effect on apartheid and will allow U.S. competitors to jump into the market, LeGates said.

The Reagan administration opposes both versions of the legislation, raising the prospect of a possible presidential veto. Administration officials said the legislation would discourage U.S. businesses — some of which provide jobs to South African blacks in desegregated workplaces — from remaining in that country.

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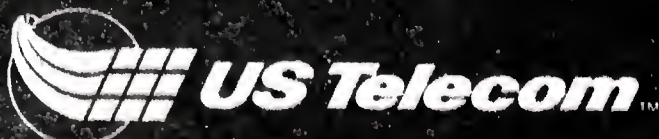
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Feedback '85 fall meet set

TOPEKA, Kan. — Feedback '85, the 10th annual conference for users of the Ken Orr and Associates, Inc. Data Structured Systems Development method of software and systems design, will be held Oct. 8-10 at the Holiday Inn Holidome here.

The conference theme will be computer-aided software engineering. Speakers will discuss trends, problems and the potential future of automated software engineering and knowledge engineering tools.

Master of ceremonies will be Nastec Corp. President Jim McGuire, whose company has developed a computer-aided systems development environment, the Nastec Design Aid.

Cost of the conference is \$500 before Sept. 6 and \$550 after that date, according to the sponsor.

For additional information, Ken Orr and Associates is headquartered at 1725 Gage Blvd., Topeka, Kan. 66604.

NEWS

Copyright council formed

WASHINGTON D.C. — Several trade organizations and businesses recently announced formation of the American Copyright Council, which will begin a public education campaign about the importance of copyright protection for creative works, such as computer software.

Charter members include the Association of Data Processing Service Organizations, Inc., the Computer and Business Equipment Manufacturers Association and the Information Industry Association, as well as publishing, entertainment and art organizations.

Council officials said that without copyright protection many creative industries could disappear, hurting the economy of the U.S. "Copyright is the wellspring of a \$141 billion industry," said Stanley Gortikov, chairman of the council. "Yet copyright is more and more at risk these days. It is becoming an endangered species," he said at a recent meeting here.

Copyright is threatened by new methods of duplicating copyrighted works, such as photocopiers, tape recorders, videocassette recorders and personal computers, officials said. "The revolution in computer and telecommunications technology provides storage and instantaneous transmission of copyrighted works on a scale not previously known," a council statement said.

The council's Declaration of Mission and Principles stated that copyrights provide the marketplace with creative works at reasonable prices, compensate creators for their efforts, encourage creativity and induce public dissemination.

Copyright principles are neither outmoded nor are they obstacles to advancement in technology, the statement said. "Copyright can, as it has in the past, coexist with technology," it said.

The council is located at 1200 New Hampshire Ave. N.W., Washington, D.C. 20036.

N.J. court strikes down law banning Sunday system use

By Charles Babcock
CW New York Bureau

PARAMUS, N.J. — Companies that want employees to operate computers on Sunday are no longer breaking the law in here.

The borough's blue law prohibiting "worldly employment" on Sunday has been struck down by an appeals court.

"This decision will relieve the stigma on Paramus. It will help us fill some of our office space," said Ralph Henig of Mack Co., an office building developer who challenged the law.

Paramus Mayor Joseph Cipolla, a defender of the blue law, said, "It isn't a dead issue," and has directed attorneys to petition the N.J. Supreme Court to review the case.

While conceding that the blue law hurt office space rentals, Cipolla said the borough allowed exceptions. The American Bureau of Shipping, a sea

freight company, was told by the mayor and council prior to the court decision to move into a Paramus office building. It would be allowed to have an employee work on its computers on Sundays by notifying police when doing so, he said.

Paramus' interpretation of worldly employment was so strict that its police once arrested a lawyer for writing a brief at his office on Sunday and a graduate student for working on her degree at her place of employment, an IBM Product Center.

Cipolla said the blue law was never intended to single out computer work but was construed in the strictest sense possible to keep retailers closed. Paramus is a crossroads community a few miles from the George Washington Bridge leading into New York's borough of Manhattan, and the residents wanted a day's relief from traffic, the mayor said.

MIT's Rockart to address SIM conference slated for Sept. 8-12

BOSTON — The director of MIT's Sloan School of Management will be the keynote speaker at the Society for Information Management's (SIM) annual conference here Sept. 8-12.

John F. Rockart will speak on management strategies of end-user computing, SIM said. Also scheduled to speak is James Martin, an author and lecturer.

The conference will focus on managing the end-user computing explosion and will include coverage of such topics as managing the marketplace for end-user computing, integrating office automation with other systems and investigating the emerg-

ing software technologies.

The conference will feature eight workshop sessions and the national SIM research paper presentation. Conference and workshop registration costs \$1,175 for members, \$600 for faculty members of SIM and \$1,295 for nonmembers. Conference-only registration is \$895 for members, \$450 for faculty members of SIM and \$995 for nonmembers. Workshop-only registration is \$350 for members, \$250 for faculty members and \$395 for nonmembers.

The SIM Conference Office is located at Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Japanese chip designs granted protection by U.S. patent office

WASHINGTON, D.C. — The U.S. Patent and Trademark Office recently granted copyright-like protection for Japanese semiconductor chip designs.

The Semiconductor Chip Protection Act of 1984, which provides special legal protection against the copying of original chip designs, also makes foreign chip designs eligible for protection in the U.S. under certain conditions.

"The record supports the conclusion that the Japanese government is making good-faith efforts and reasonable progress toward enacting legislation that would be in compli-

ance with the U.S. law," according to Donald J. Quigg, acting U.S. commissioner of patents and trademarks.

The order was the first one that involved chip protection for another nation since enactment of the U.S. law in November [CW, Oct. 10, Jan. 21].

The law provides a 10-year term of protection for original "mask works" either from the date of registration with the U.S. Copyright Office or from the date of the first commercial exploitation.

The order is retroactive to Nov. 8, 1984, and it terminates on June 6, 1986.

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COMPUTERWORLD

VDT-related laws pass in two states

Two more states recently added laws pertaining to the use of VDTs.

In Rhode Island, the nation's first VDT bill to become law this year requires the state's Department of Labor to produce a brochure on VDTs in the workplace and to conduct workshops and training sessions on VDT operation.

Although not directed specifically at VDT workers, a new Maine law now mandates 30-minute rest breaks for every six hours of work for all state and private employees. The bill applies to all workers in the state, including VDT operators.

This year, VDT-related legislation was filed in more than 20 states.

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NEWS

INTERNATIONAL
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AUSTRALIA

CANBERRA — Promises made were promises kept when the federal government approved a 150% tax write-off for research and development efforts here. The legislation delivered by Australia's Ministry for Industry, Technology and Commerce goes into effect July 1.

SYDNEY — The first system crash happened at the New South Wales Health Department before the agency even switched on its brand-new Digital Equipment Corp. VAX 8600. After delivery to the site, the VAX 8600 system crashed through the floor of the computer room and narrowly avoided plunging out a window, sources reported. The department, which had the computer room built by a third party rather than DEC, fortunately had opted for DEC's insurance plan. DEC Pty. Ltd. replaced the damaged machine within a week, a spokesman said. The embarrassed health department is presently conducting an investigation into the cause of the accident.

SYDNEY — A newspaper publisher here is so confident of Facom Ltd.'s reliability that it will upgrade its current dual system with a single M3800 mainframe. "We've never had a reliability problem where the whole show is off the air during the six years we've been using the two smaller Facom M160s," said Frank McMahon, DP manager for John Fairfax and Sons Ltd. The paper had used one system for on-line processing and the other for batch purposes and for backup in emergencies, but an emergency never occurred, McMahon said.

BELGIUM

BRUSSELS — Europe will

capture roughly 30% of the world market for new technologies, which translates to 10 million new jobs, according to industry guru Etienne Davignon.

The European Economic Community, which will consist of twelve member countries as of January 1986, can combine in an open market 23% larger than the U.S. market, Davignon claimed. It is not the technology that will spell success for the European high-tech community, Da-

vignon argued, but rather Europe's political infrastructure.

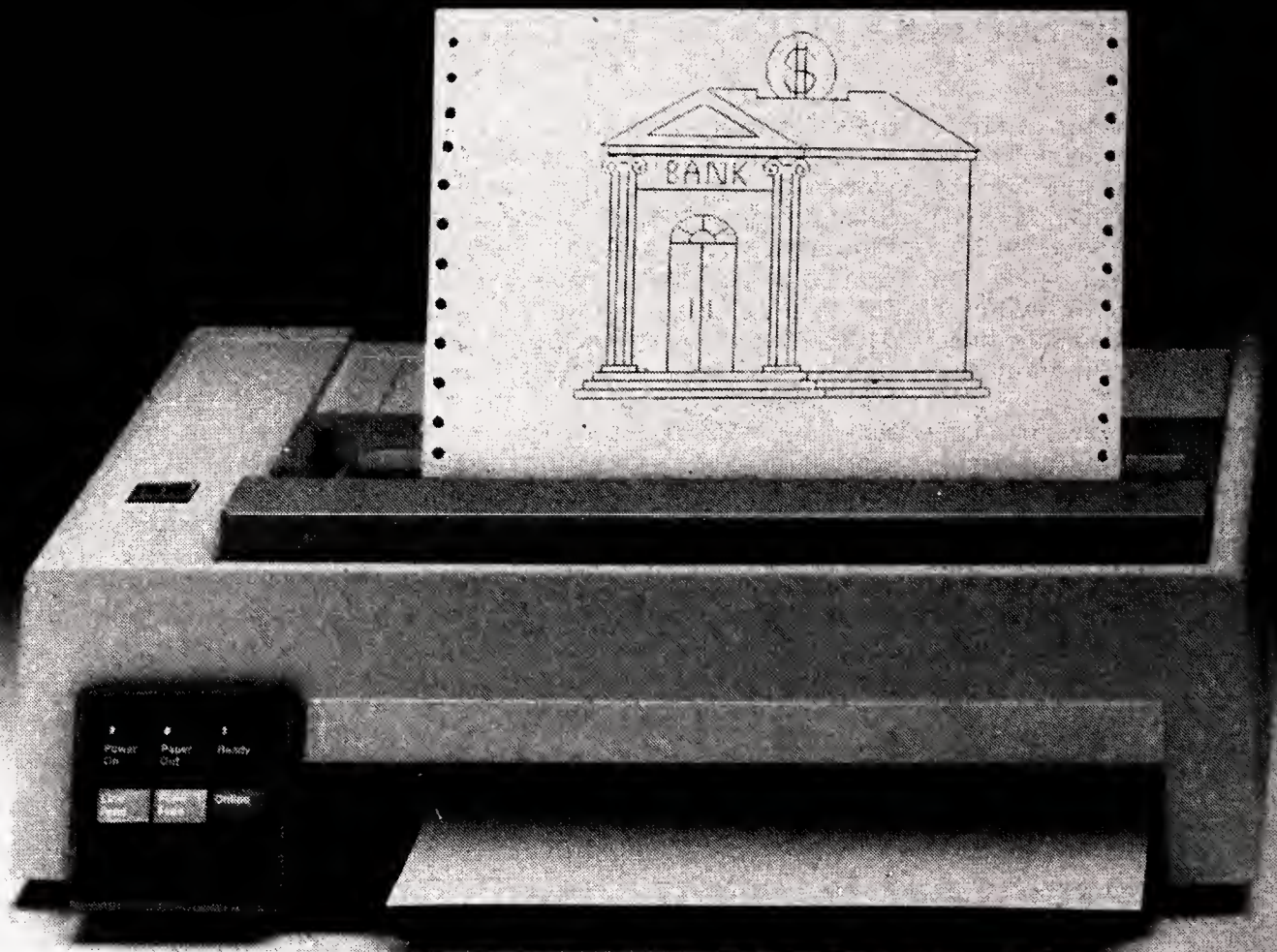
BRUSSELS — Belgium's Postal Telephone and Telegraph (PTT) agency is planning to extend its videotex service to up to 10,000 subscribers this year. The system runs on Videogate front-end computers, which are manufactured by British Microscope, and has a current user base of 5,000, a spokesman said.

The network conforms to European videotex standards and is able to support French Teletel and the UK's Prestel videotex services. Belgian videotex subscribers reportedly have access to public and private information services and to international networks. The Belgian PTT's videotex service is expected to improve its financial standing. The agency posted profits of \$5 billion for 1984 and losses of \$500 million in 1983.

ENGLAND

LONDON — Japan's biggest micro manufacturer has turned its back on IBM, vying to become the No. 1 alternative supplier here. NEC Corp. has launched the APC III in the UK, with a promise to work closely with British software houses to develop products for its micro. The product is a single-user, stand-alone system priced at \$3,300 for a monochrome

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FUSION

NEWS

screen and \$3,800 with a color screen. It comes with the NEC Foundation Package, a system with word processing, telecommunications and calculator/clock functions, the vendor said.

■
LONDON — Dealers who guarantee the systems they sell are taking unreasonable risks, according to a high-tech insurance company here. Wigglesworth Insurance Ltd. has introduced a policy to cover dealers' main-

tenance contracts because it believes these dealers are "dabbling in insurance without reinsurance," resulting in an average of one dealer going into liquidation every week, a spokesman said.

FINLAND

HELSINKI — Digital Equipment Corp. is the first vendor to sell an integrated cluster solution here. DEC sold two VAX-11/785 sys-

tems, a collection of Microvax II machines, PDP-11/73 systems and its Ethernet communications network to Oy Kaukas Papermill to provide the company with production management, quality assurance, marketing and MIS capabilities.

The implementation, valued at \$1.5 million, is slated for next January, according to a company spokesman. The paper manufacturer is located 10 miles from the Soviet border.

FRANCE

PARIS — Bull has signed a tentative agreement with Japan-based NEC Corp. that will reportedly enable the French group to extend the power of its DPS 7 line of medium-size processors with NEC equipment. The agreement calls for Bull to purchase NEC's Acos 750 CPU, which is said to be similar in architecture to that of the Bull machines.

Meanwhile, Bull announced five additions to its line of DPS 90 systems, similar in configuration to those recently announced by Honeywell Information Systems, Inc., Bull's U.S. affiliate. The Bull announcements include the following systems: a single processor, a dual processor, a fully redundant processor, a triple processor and a four-processor configuration.

■
PARIS — Gould, Inc. introduced a clustered computer configuration, called the SCI-Clone 32, during the recent International Aeronautical Exhibition here. The product, based on the vendor's SCI-Clone 32 line of superminicomputers, is intended for real-time and simulation applications, a spokesman said. It reportedly operates at 30 million instructions per sec., consists of a host and up to eight nodes, with each node composed of one to four CPUs.

The network is connected via a communications bus working at 26M bit/sec., the vendor said. A basic configuration of the SCI-Clone 32 will cost about \$150,000. The product will be announced in the U.S. at a later date, the vendor said.

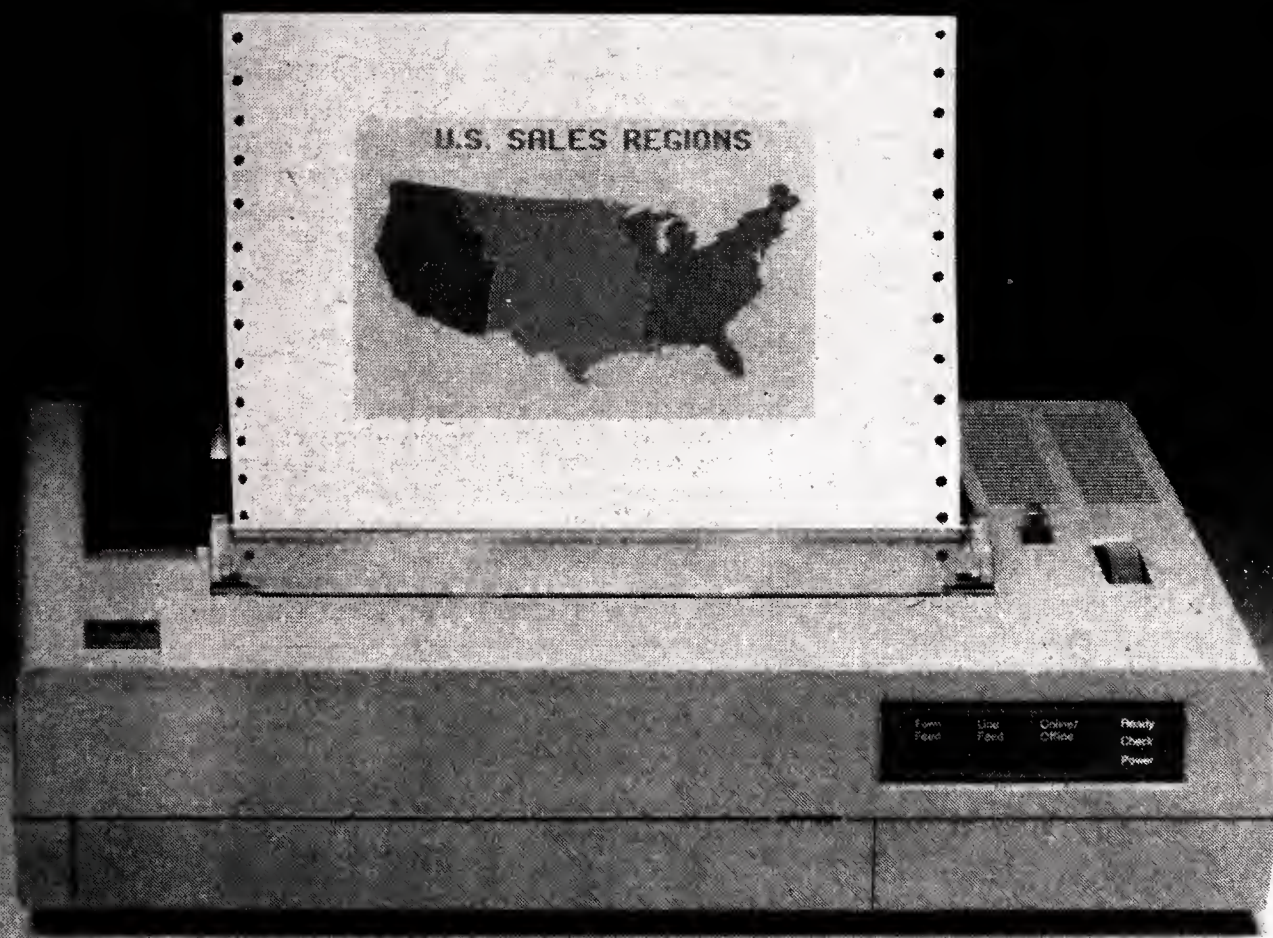
JAPAN

TOKYO — IBM Japan and Computer Service Corp. (CSC), an independent software firm here, have established a company called Japan Information Engineering Company Ltd. The joint venture is expected to begin operations in October. IBM Japan, holding 35% of the company, will provide technical assistance in the design and construction of large-scale information systems. CSC will handle the bulk of applications development, a spokesman said.

NETHERLANDS

EINDHOVEN — Philips Information Systems, Inc. has acquired a division of the Computer Center of Limburg, a major Digital Equipment Corp. systems house here. In the recent takeover bid, Philips beat the large Dutch group Minihouse, one of the largest DEC systems houses in Europe, according to sources.

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NEWS

Software saves ambulance firm from billing trauma

COVINA, Calif. — "Hurry up and wait" was the status quo at an ambulance service here until the firm automated its billing and collection procedures.

"Our job is to make sure our patients are transported as quickly as possible from the scene of an accident to the nearest hospital," said Jim Decker, president of Crippen Ambulance Service, Inc. But Crippen often had to wait months to get paid for its services.

"Being in the ambulance business, we can't control the types of patients that we pick up at the scene of an accident," Decker said. "We can't run a credit check to see if a patient has the ability to pay us — that's not our job."

The company answers about 1,500 ambulance calls a month and sends bills for its services to a variety of third-party insurance companies, to Medicare and Med-

icaid and to individual patients who have no insurance. The volume and variety caused record-keeping problems.

"It was extremely hard to track where all our money should have been coming from," Decker said. In addition, 40% of Crippen's billings went to Medicare, which sometimes took up to 60 days to turn around claims and to issue payments. Crippen installed two software packages, both from Lion Computers, to tackle its billing and collection problems.

In 1980, it installed Lion's Ambulance Billing and Collection System (ABCS), which Crippen helped the vendor put together. The system generates bills, based on coded information keyed into it from ambulance attendants' reports, and also produces reports that help Crippen track its billings and manage its business.

When an ambulance driver or attendant returns from a call, he fills out a worksheet that includes information such as the patient's name and address, his doctor's name, the type of medical service provided, the type of insurance the patient holds, the mileage on the call, whether the call was a night call that carries a surcharge and whether it was an emergency or not.

Employees in Crippen's billing department enter the information into a 196K-byte Data General Corp. Nova 3, where the ambulance call data is run against Crippen's service rates, which are maintained on the machine. The system then generates itemized bills for customers or their insurance agents.

ABCS also generates operational and revenue reports on demand that the company uses to help manage its business.

Operational reports break down information by different variables to show how efficiently the company is using its resources. Geographical reports, for example, show how many calls are made in the different areas Crippen serves. If two areas are near each other and one generates twice as many ambulance calls as the other, Crippen will shift each area's boundary to make the volume more equitable, according to John Wilson, the firm's general manager.

Revenue reports track the

firm's profitability and help it adjust its rates. If one area consistently has a large number of customers who do not pay their bills, Crippen may choose either to stop serving the area or to raise its rates there. This way, Wilson said, "Those who do pay you make up for those who don't pay you."

Crippen installed its second software package in 1983 to help it recover Medicare payments as quickly as possible. The software, Lion's Electronic Billing, pro-

See TRACK page 31

Insurer uses electronic billing

Cuts claims load, turnover time

LOS ANGELES — For the insurance firm that administers Medicare monies in most of Southern California, electronic billing to health care providers like Crippen Ambulance Service, Inc. has eased the crunch between a staff shortage and a growing Medicare claims load.

"We can't hire enough

[people] to keep up with the claims volume," said Stan Kirkham, Transamerica Occidental Life Insurance Co.'s manager of electronic media claims operations.

Transamerica's Medicare claims processing doubled in 1980, when the Medicare administration redrew the boundaries of the areas in which its carriers operated. Carriers like Transamerica are authorized to draw on a Medicare trust fund in order to pay health care providers

in a given region for services they administer to Medicare recipients.

Since the redistricting in 1980, Transamerica's claims processing has increased 10% a year. Along with this, the U.S. Department of Health and Human Services' Health Care Financing Administration, which administers the Medicare program nationally, has cut back on money it provides carriers for Medicare processing. The cuts affect staffing levels.

Electronic billing helps Transamerica reconcile the gap between claims volume and its staff shortage by allowing individual staff members to handle more claims. Eight claims examiners can process 150,000 to 175,000 claims per month electronically, Kirkham said. With claims that come in on paper, the same monthly volume would require the services of between 45 and 50 examiners.

The insurance firm began to develop computerized processing for the health care providers it serves in 1979, when a mandate from the government directed it to do so. That mandate said insurance firms that administer Medicare money to physicians, clinics, ambulance companies and other health care providers had to computerize their operations.

Transamerica responded with a two-pronged approach: First it offered automated claims processing by magnetic tape, then it opened up the service to health care providers who had telecom-

See CLAIMS page 31

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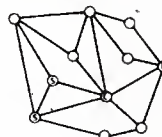
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Of the big three in software, who's really number one?

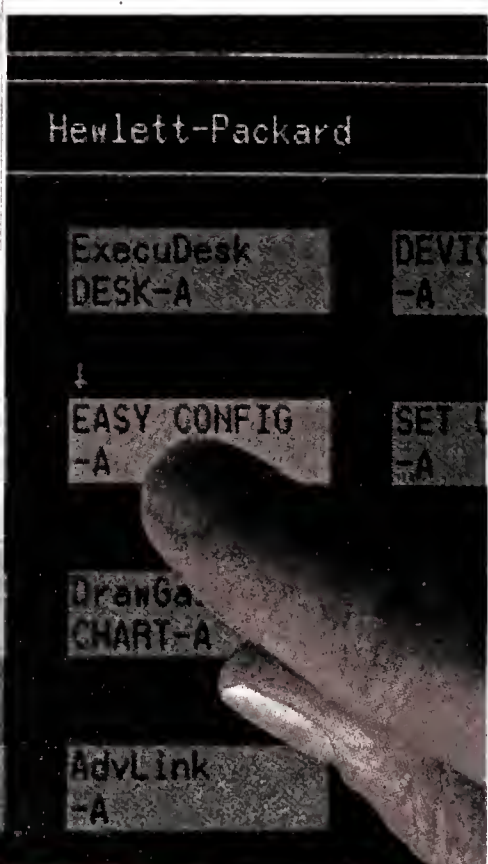
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NEWS

CLAIMS from page 26

munications capabilities.

In 1980, Transamerica developed a format for automated claims processing that met guidelines Medicare had established for its program. The firm then began talking with doctors about its plans to automate its processing with magnetic tape. "We had to allow information to filter into the medical community that this was the way we were headed," Kirkham said.

He sent questionnaires to the doctors and to service bureaus, which at the time provided most doctors' data processing. The forms asked the recipients what kind of computer capabilities they had, and Transamerica used the answers to set up its system.

The information helped Transamerica fit its system to doctors' needs. "If they had to buy a new system to process claims electronically, it wasn't worth it," Kirkham said. The firm had planned to use tape with a 6,250 bit/in. density, for example, but found that 1,600 bit/in. tape was what most doctors used. It changed its plans and went with the 1,600 bit/in. tape.

Transamerica brought its magnetic tape claims processing up on an IBM 3081 in November 1981. At first, only one service bureau agreed to sign on. "No one was willing to venture forth into an unknown venture at that point," Kirkham said.

Once the system proved reliable, more organizations started using it. Today, 44 service bureaus send health care providers' Medicare claims to Transamerica either on magnetic tape or over telephone lines. Some providers bypass the service bureaus and deal directly with Transamerica.

In 1982, Transamerica began offering electronic claims processing via telecommunications. As it did during its venture into magnetic tape processing, the firm asked doctors what kind of equipment they had in order to find out how to set up its system.

Data transmitted at different speeds

Because doctors transmitted their data at different speeds, for example, Transamerica set up its claims processing to accept information coming in at 1,200, 2,400 and 4.8K bit/sec. Now, Kirkham said, "We can deal with anyone who's capable of telecommunicating the data to us."

Users send their data to the insurance firm through modems over voice-grade telephone lines. The data enters a Datapoint 8800 at Transamerica, which massages it and passes it to the 3081 for processing.

To be accepted as participants in either the magnetic or the telecommunications claims processing services, users must propose the software they plan to use to record their claims to Transamerica. The insurance firm has authorized 22 vendors' software packages for use with its system, Kirkham said. Some large clinics and other health care providers that have programmers in-house have also had programs accepted.

The electronic setups allow Transamerica to turn claims around in seven to 10 days, as opposed to an average 15- to 30-day cycle the firm needs to process paper claims, Kirkham said. Of the 26,000 health care providers who file Medicare claims with the insurance firm, approximately 3,500 make use of electronic processing.

TRACK from page 26

vided a setup through which Crippen could send its Medicare claims and receive payment electronically rather than manually.

The firm uses the software to prepare its claims according to Medicare's electronic billing guidelines. Data from the claims is captured on magnetic tape.

Each week, Crippen sends a claims tape by courier to Transamerica Occidental Life Insurance Co., which pays out Medicare monies to ambulance services, doctors and other health care providers in Southern California.

Payments received more quickly

Transamerica offers computerized claims processing as a means for health care providers to receive

Medicare payments more quickly than they would if they used paper forms.

The firm runs Crippen's tapes on its own machine, which generates payments and a magnetic tape record of those payments.

Sending claims on tape rather than paper has cut the time Crippen must wait for Medicare payments from between one and two months to seven days, Wilson said. "What I bill this week, I will get paid for next week, he said."

Courier drops off tape, picks up checks

When Crippen's courier drops off one week's tape, he picks up checks generated from the last week's tape along with a tape on which Transamerica has recorded the amounts it has paid on each claim.

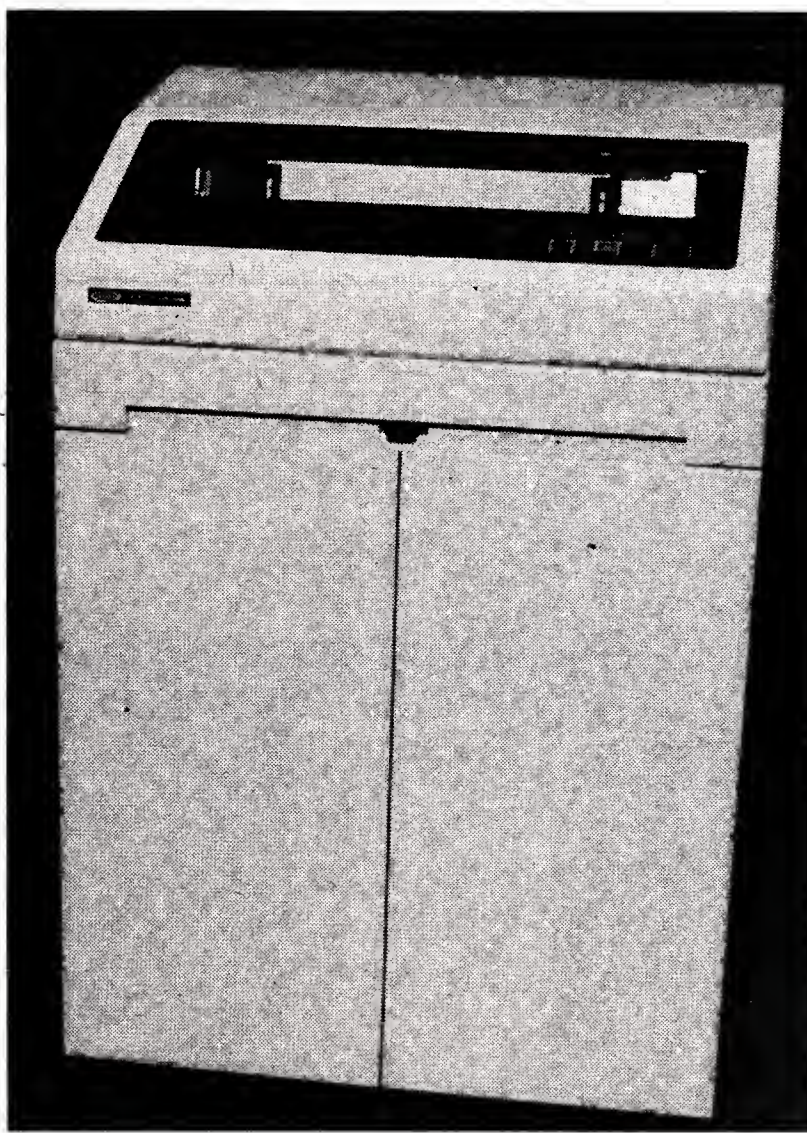
The ambulance service then runs

this tape on its DG minicomputer. The data from the tape distributes payments to client records and updates the firm's accounts receivable files. Wilson said the payment tape runs in about 20 minutes, whereas manual posting would take between four and six hours.

Medi-Cal, California's Medicaid service, recently began offering computerized services similar to those Transamerica Occidental provides for Medicare, but Wilson said that Crippen's Medicaid volume is too low to justify investing in automated processing.

The only additional automation the firm anticipates during the near future is a point-of-sale system, scheduled to be up and running soon in a medical equipment shop that Crippen operates, according to Wilson.

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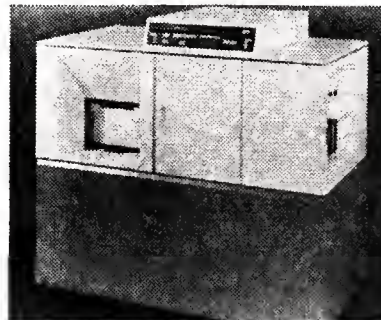
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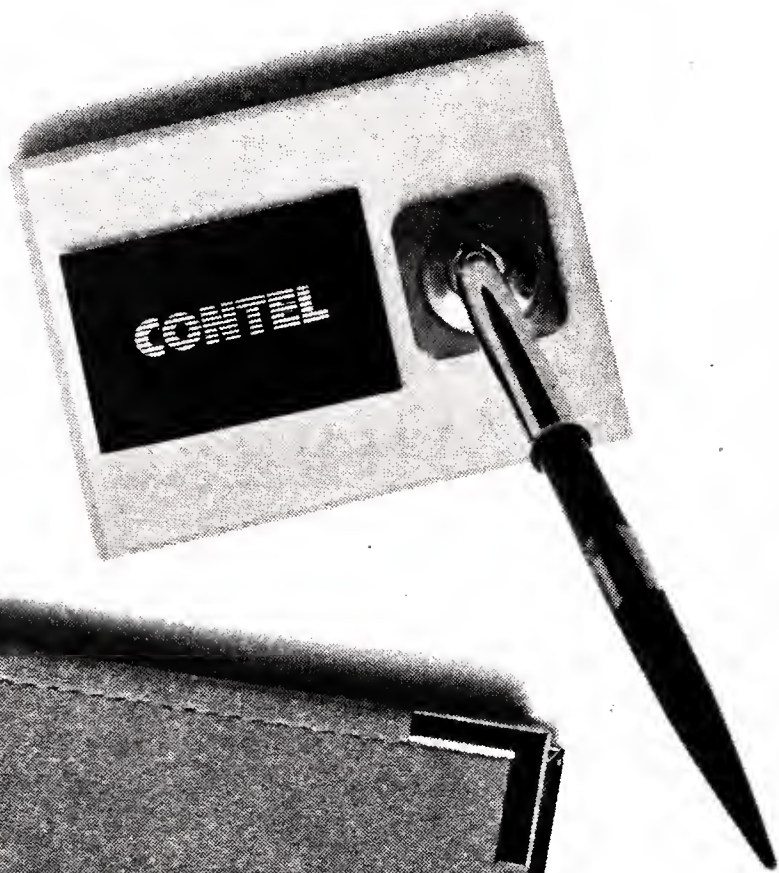
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**YOU MUST ANSWER THESE QUESTIONS
TO QUALIFY FOR THE PROFESSIONAL RATE**

1. BUSINESS/INDUSTRY (Circle One)

- End Users
- 10 Manufacturer (other than computer)
- 20 Finance/Insurance/Real Estate
- 30 Medicine/Law/Education
- 40 Wholesale/Retail Trade
- 50 Business Service (except DP)
- 60 Government—State/Federal/Local
- 65 Public Utility/Communication Systems/Transportation
- 70 Mining/Construction/Petroleum/Refining
- 75 Other User

Vendors

- 80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

2. OCCUPATION/FUNCTION (Circle One)

- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DPMS Services
- 22 Director/Manager of Operations/Planning/
Administrative Services
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor, Programming
- 32 Programmer/Methods Analyst
- 33 QA/QP Director/Manager/Supervisor
- 34 Data Comm Network/Systems Mgmt
- 41 Engr/Scientist/R&D/Tech Mgmt
- 51 Mfg Sales Reps/Sales/Marketing Mgmt
- 52 Consulting Mgmt
- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other

3. COMPUTER INVOLVEMENT (Circle all that apply)

Types of equipment with which you are personally involved either as user, vendor or consultant

- A. Mainframes/Supersminis
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems

NEWS

Micro-to-mini link saves building firm \$3,300 a month

EVANSVILLE, Ind. — Traylor Brothers, Inc., an international construction firm headquartered here, is now using a micro-to-minicomputer link in its efforts to attack high communications costs and low productivity rates.

Installing IBM Personal Computers in three of its construction site field offices has saved Traylor \$3,300 a month in telecommunications bills, according to Charles H. Sparrenberger Jr., Traylor's DP manager. The micros link up to the IBM System/34 at corporate headquarters here via AST Research, Inc. 3780 synchronous communications cards and Racal-Vadic, Inc. Autodial VA212 modems.

At Traylor construction sites in Louisiana, Utah and Kentucky, IBM Personal Computers and Epson America, Inc. FX100 printers replaced permanently on-line dumb IBM Model 12 terminals. Traylor Brothers developed software in Basic for the Personal Computer to allow entry of payroll and accounts payable transactions and also to allow printing of payroll checks and associated edit reports, Sparrenberger said.

The company went to a manual-call manual-answer communications system to allow file transfer between the minis and microcomputers, according to Sparrenberger.

Saving \$3,300 a month

Because Traylor field users only need to access the System/34 when entering or calling up data, on-line time and its resulting communications cost has been cut by 90%, according to Sparrenberger. "We save roughly \$3,300 a month," Sparrenberger said. "So I've done all right."

Traylor was one of the System/34's first customers, having purchased it in the summer of 1978. On the mini, IBM's construction software package, Cmas, is used as the nucleus of the accounting system.

Traylor Brothers has developed numerous packages in-house for equipment costing and billing, estimating and insurance management. Several of the Cmas programs have been modified in the areas of data entry and management reporting to give the company data in a custom format. "We [Sparrenberger and another DP employee] wrote reports based on Cmas' files and bells and whistles," Sparrenberger said.

The decision to choose the IBM Personal Computer essentially grew out of Sparrenberger's satisfaction with his initial Personal Computer experience.

"We had bought one for the Evansville office in the fall of 1982 and were exploring ways we might use it in the business," Sparrenberger said. "We came up with this idea to replace our on-line terminal system."

In addition to lower communications costs, the micros give Traylor's remote site employees the opportunity to enhance local productivity with microcomputer software programs. The project manager in Duchesne, Utah, for example, purchased Microsoft Corp. Microsoft Project to manage better the construction of an 8½-mile irrigation viaduct tunnel for the U.S. Bureau of Land Reclamation.

"The micro helps him keep track of what's left to do on the project, scheduling and target dates," Spar-

renberger said. "That's productivity."

At Traylor's permanent southern marine division office in Baton Rouge, La., employees use Peachtree Software, Inc. Peachtree word processing software to compose and print subcontractor application forms and paychecks.

Renee Muir, a computer operator in Baton Rouge, said the Personal Computer-System/34 link allows her to interact with accounts receivable and payroll information stored on the mini at headquarters here. "I can do much more now," she said. "I can get into the memory and make necessary changes where I couldn't before. I'm only human — I do make errors

— and when I can get in and change them right away, I'm happy."

Sparrenberger said the micros ease demand on the mini's CPU, because resources of the System/34 are not being taxed by data entry being done in a field office. And the field offices' processing time is not dictated by the time schedule of the office here. For example, Utah is one hour behind the office here, and site employees at Traylor's dam project in Greenup, Ky., are one hour ahead. When the office here shuts down at 4:30 p.m. CST, the Utah office is able to process until closing time in that time zone.

"Basically, our two goals for the Personal Computers were to cut com-

munications costs and to keep the same amount of interactive editing available in the field offices that we had before," Sparrenberger said. "We've accomplished both."

The Personal Computer used in Kentucky was formerly used on a Traylor sewer project in Anchorage, Alaska. Sparrenberger said he will not hesitate to transport any existing micro to a future construction site office or to purchase a new unit for the location.

"In the past, we had to call AT&T to install special connections for the terminals when we set up a new field office," he said. "Now we can just take the [Personal Computer] to the office and plug it right in."

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COMPUTER FAT.

HOW TO AVOID IT, FROM THE LEADER
IN ON-LINE TRANSACTION PROCESSING.

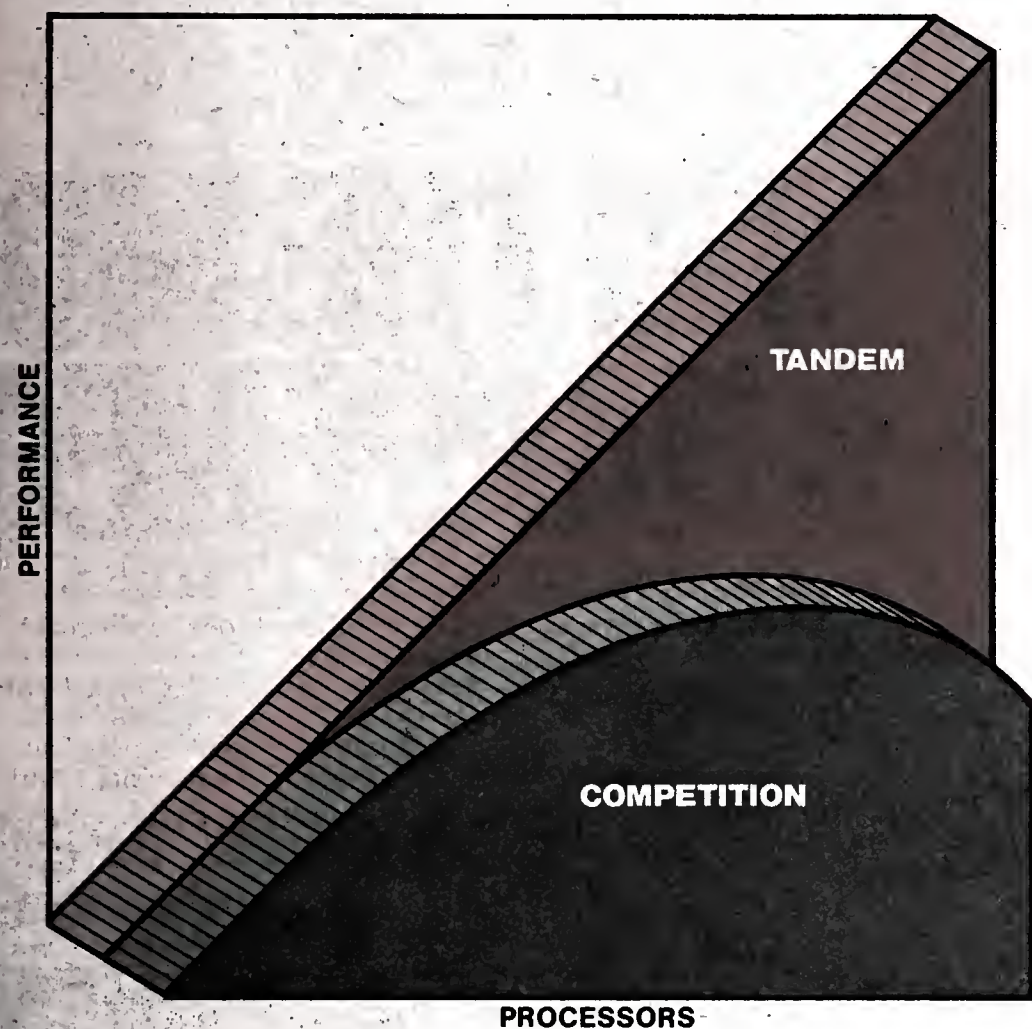
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Computer fat is created when you buy more computer than you need. With conventional computer architecture, you have no other choice. You buy the closest fit available and "grow into it."

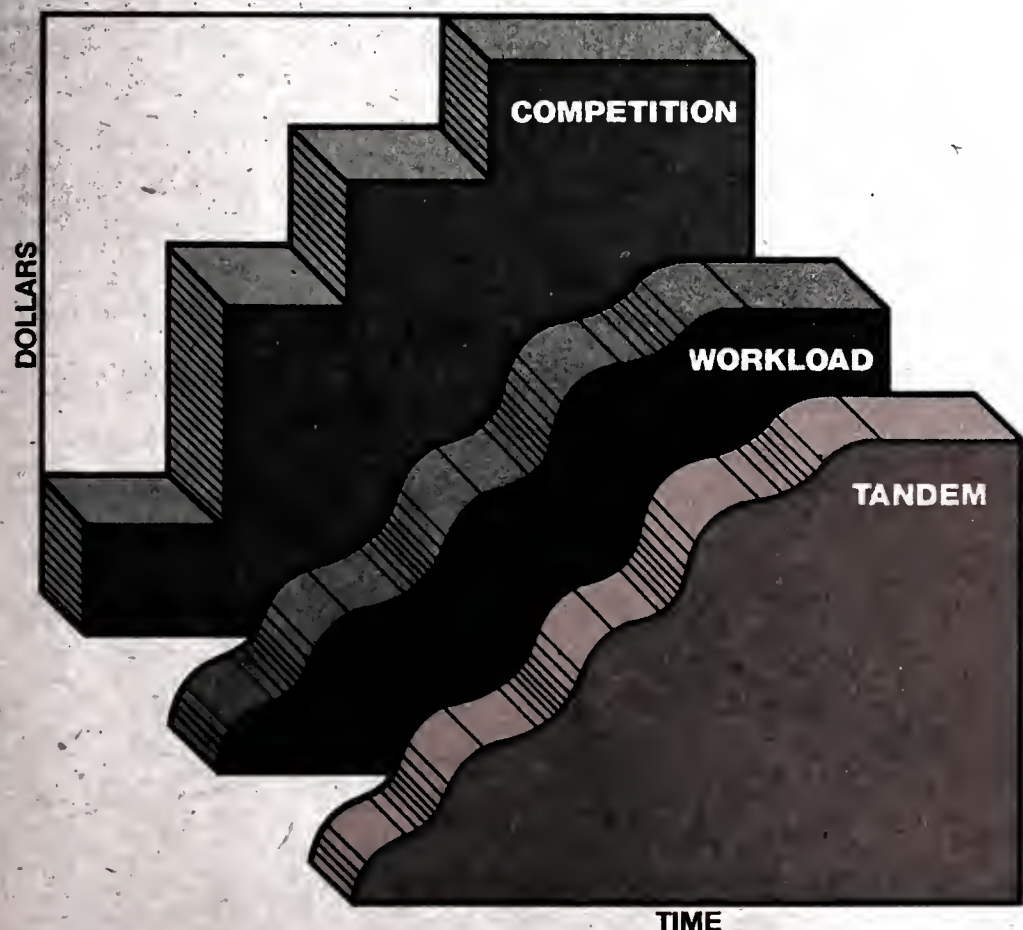
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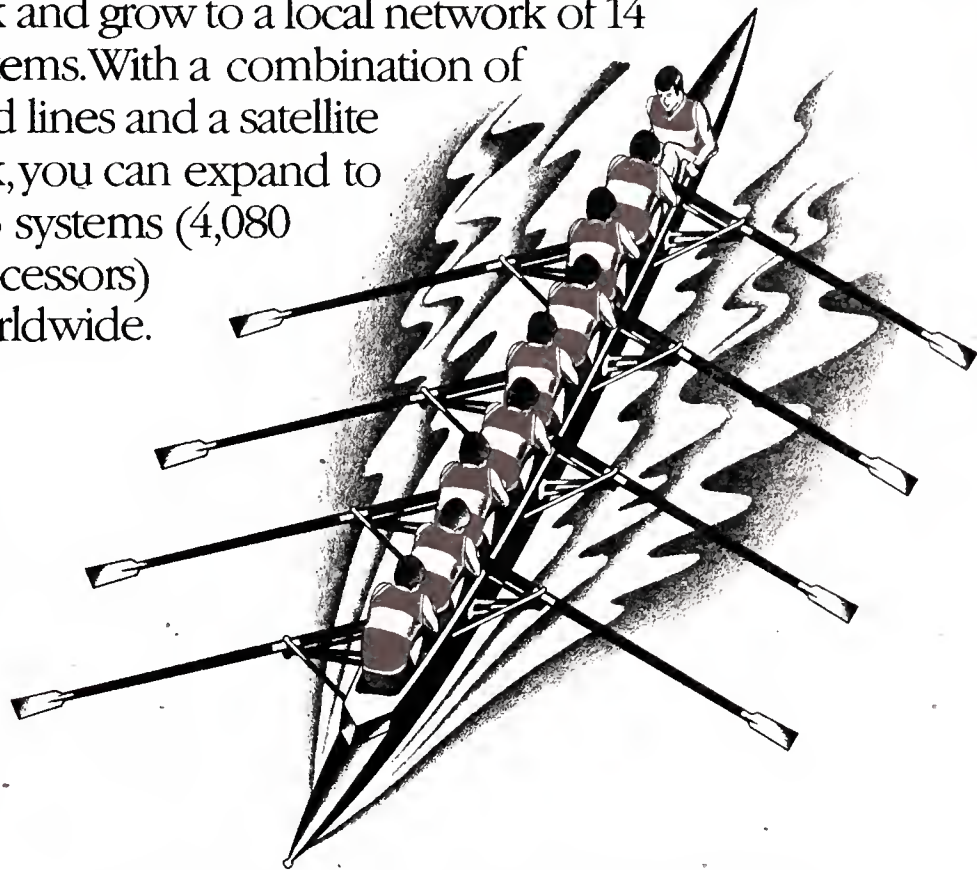
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NEWS



CALL FOR PAPERS

SIR/DBMS' SECOND ANNUAL CONFERENCE
 Chicago, Oct. 20-23

Papers are now being sought for this second annual conference. Special interest groups and panel discussions of where current hardware trends are leading the industry are scheduled for the conference. For more information about the conference or to submit an abstract, contact Judy Eftekhari, Director of Communications, Sir, Inc., 5215 Old Orchard Road, Skokie, Ill. 60077; or Dave Hall, Chairman, Users Group Board of Governors, Florida International University, Serdac/PC 549, Tamiami Campus, Miami, Fla. 33199.

INFORMATION SYSTEMS ASSESSMENT

 Noordwijkerhout, The Netherlands,
 August 27-29, 1986

A call for papers has been issued by the conference chair. Possible issues to be addressed are scientific foundations for information systems assessment; methodologies for information systems assessment (methods, techniques and procedures); relevant dimensions of information systems assessment, measurement problems for information systems assessment performance; stakeholders and interest groups in information systems assessment; evidence of information systems benefits and evaluation criteria for implementation success; and present standards and practice (state of the art) for information systems assessment.

Letters of intent (due July 1), full papers (due Nov. 15) and requests for information should be addressed to Niels Bjorn-Anderson, Program Committee Chairman, Institute of Informatics and Management Accounting, 60 Howitzve, DK 2000 Copenhagen F, Denmark.

COMPUTER GRAPHICS '86
 Anaheim, Calif., May 11-15, 1986

A call for papers has been issued by the National Computer Graphics Association (NCGA) for their seventh annual conference and exposition. Tutorials and technical sessions at the conference will focus on the application of computer graphics to a wide variety of business and industry situations. Individuals interested in proposing a tutorial or technical paper for Computer Graphics '86 should contact the NCGA for a copy of the official call for papers brochure. Abstracts are due to the NCGA no later than Sept. 15. For information and copies of the brochure, contact the Education Coordinator, NCGA, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

THE 16TH CONFERENCE ON COMPUTER AUDIT, CONTROL AND SECURITY

Fort Worth, Texas, April 28 to May 2, 1986

A call for abstracts has been issued for this 16th annual conference. Examples of subjects of interest are networks and data communications; audit, control and security of user-

developed systems; information security in advanced environments; coping with microcomputer proliferation; auditing on-line systems; detecting fraud in computer systems; advanced DP audit techniques; controlling office information systems; auditing in a data base environment; getting the most out of DP audit resources; measuring the effectiveness of controls; experience with computer security products; and technology updates.

No written paper is required for this meeting.

Send at least a one-page abstract of what you propose to present and a brief biography. Abstracts and biographies must be received no later than Sept. 20. Send abstract to the Program Chair, EDP Auditors Foundation, 373 S. Schmale Road, Carol Stream, Ill. 60188.

1986 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. CONFERENCE ON ROBOTICS AND AUTOMATION
 San Francisco, April 14-17, 1986

Papers are solicited in all areas of robotics and automation, including flexible manufacturing, materials handling, scheduling and control, system design and control, modeling and simulation and economic evaluation. Papers describing novel theory and/or applications are invited.

Four copies of papers, 15-20 double-spaced pages, should be sent by Oct. 1 to Rajan Suri, University of Wisconsin at Madison, Department of Industrial Engineering, 1513 University Ave., Madison, Wis. 53706. Further information is available from Robotics and Automation, c/o Harry Hayman, 738 Whitaker Terr., Silver

Spring, Md. 20901.

INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING (IFIP) CONGRESS '86: THE 10TH WORLD COMPUTER CONGRESS
 Dublin, Sept. 1-5, 1986

Papers are now being sought for this congress. All submitted papers should concentrate on addressing a wide class of real-world problems; relating different, alternative or complementary approaches to design and development; filling gaps between different fields; and explaining to the interest groups the rationale of the approaches taken.

Five copies of each paper should be submitted to the Congress Secretariat, Ifip Congress '86, 44 Northumberland Road, Dublin 4, Ireland. The submission deadline is Nov. 1.

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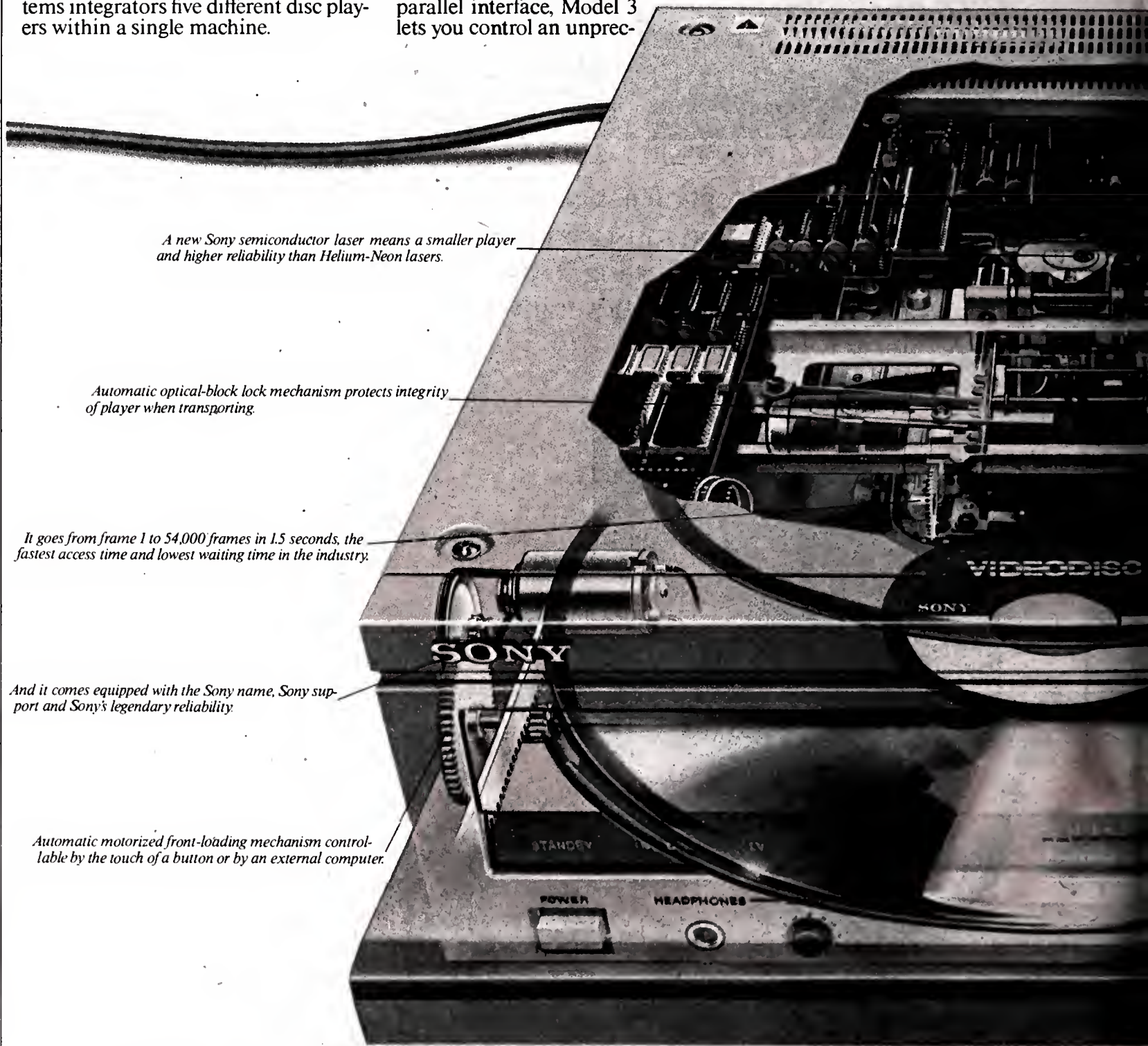
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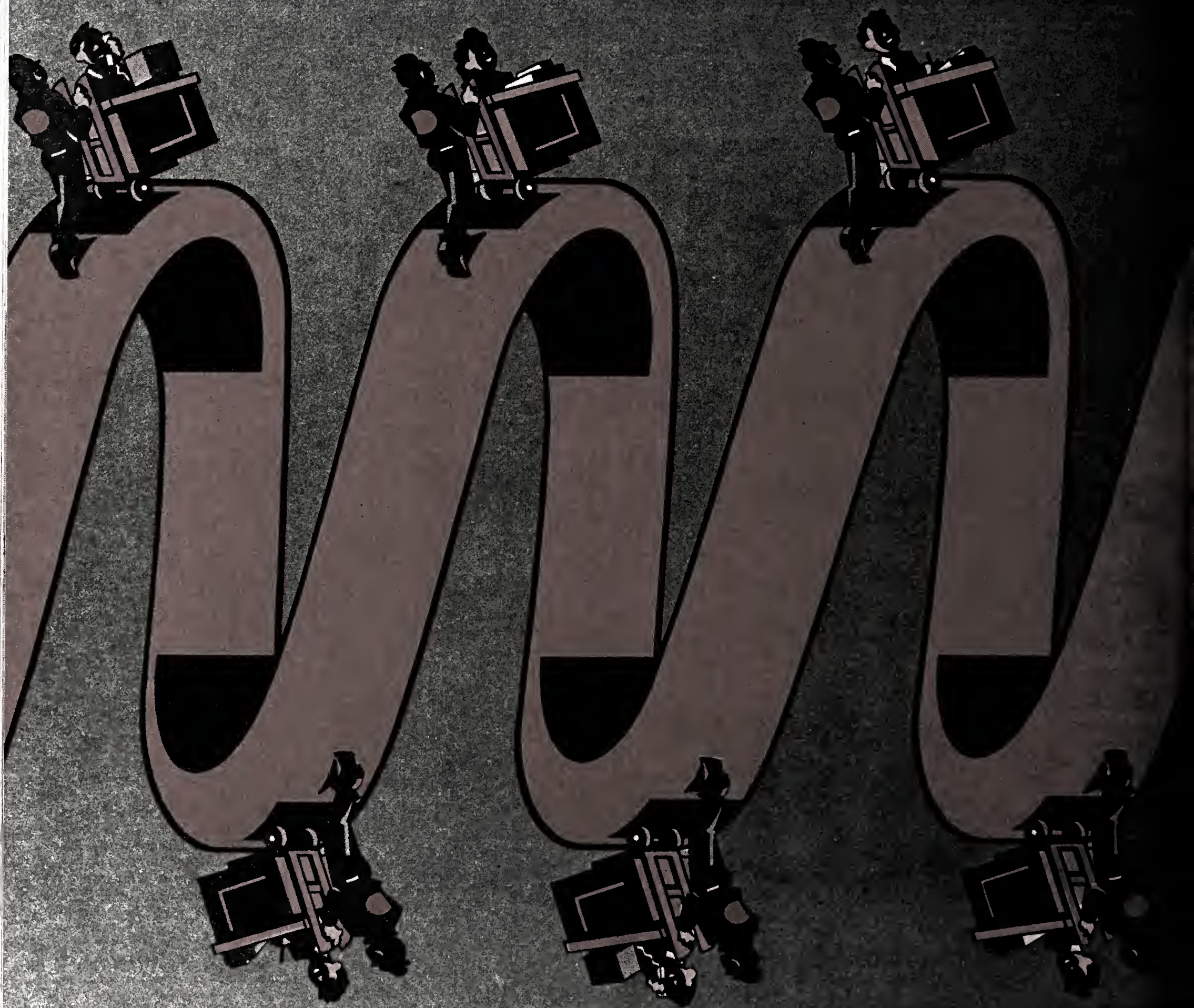
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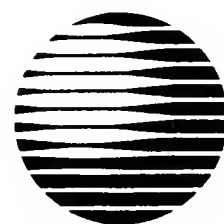
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EDITORIAL

MIS security a risky gamble

MIS executives, beware. If your system is hit by a computer criminal whose identity is discovered, the odds are better than nine to one that he is a company insider.

That was one message from a recent survey of Data Processing Management Association members [CW, June 10].

Although the odds are favorable that your system will not suffer some form of abuse, the survey's statistics may be painting an unrealistically optimistic picture. Companies are admittedly reluctant to divulge system abuses — that's the survey's second message. Out of 56 abuses outlined in the study, just 2% were reported to authorities. In addition, more than half of the respondents who were victims of abuses said they believed the abuses occurred either because the employees were ignorant of proper professional conduct or as a result of the perpetrators' "misguided playfulness."

The number of computer crimes written off because of embarrassment, the potential for bad publicity and the corporate funds needed for legal fees if a decision to prosecute is made is any expert's guess. And more than half of the survey's respondents apparently don't believe the problem has become serious enough to warrant any sort of data security staff.

If you are optimistic and believe computer crime couldn't happen in your organization, consider the following:

- The same issue of *Computerworld* in which the DPMA survey was reported also carried a story on two former employees of the Social Security Administration who were charged with computer fraud to gain SSA benefits. It is still unclear exactly how much money the defendants obtained, but Assistant U.S. Attorney Henry Wingate referred to the theft as a "large sum."

- Wilson Jones Co., a subsidiary of American Brands, Inc., recently had to come up with hard cash for Micropro International Corp. to obtain an out-of-court settlement of a suit charging that Wilson Jones employees had engaged in unauthorized copying of three Micropro software products. Although the amount of the settlement was unspecified, the original suit requested damages of \$225,000 and the return of any profits earned as a result of the alleged copying [CW, June 3].

- A Houston programmer was charged earlier this year with the theft of \$100,000 for alleged fraud involving the illegal tapping of a credit bureau's computer system [CW, Jan. 14].

- In 1983, the banking industry paid premiums totaling \$11.6 million for overall DP insurance policies and an added \$4.7 million for separate computer crime policies [CW, Jan. 14]. Although more recent figures have not been compiled yet, chances are good that those premium charges have not gone down.

- *The New York Times* and *The Washington Post* both recently reported that the U.S. Department of Justice is expanding the Federal Bureau of Investigation's national computer system to include information about persons suspected of committing white-collar crimes. It's a case of using modern technology to detect and prosecute the criminals who use the same technology to commit fraud, according to Associate Attorney General D. Lowell Jensen.

If computer abuse takes place in your shop — whether committed by an employee or an outsider — it will be expensive. It's also clear that both the banking industry and the FBI (neither of which are known for fast-moving reactions to change) are taking computer fraud very seriously. Isn't it high time you did the same?



LETTERS

Cable search an unrealistic scenario

Perhaps I missed the point completely, but I came away from reading the column "The cable quest: Abracadabra in Akihabara" [CW, May 13] and the conclusion to it [CW, May 27] with the impression that a large amount of high-visibility magazine space was wasted. Aside from stating the all-too-obvious fact that the hardware manufacturers are insensitive to the needs of the user, the column illustrated only that users show too much forbearance in waiting for things to be done for them.

A cable is a piece of wire with a connector at each end. An RS-232 cable, by definition, is terminated with miniature 25-pin connectors. The main differences between cables is in the number of signals used: from three to a maximum of 25. In many

cases, an off-the-shelf, 25-conductor cable will do nicely. In rare cases, you may have to swap the second and third pins (transmit/receive) to get it to work.

All the parts necessary for the column's author to make the missing cable were readily available. If an off-the-shelf cable wouldn't work, and if the specifications for the cable were not supplied as part of the operator documentation, they were probably available by making one phone call to the manufacturer. And, if all else failed, you just pull out some wire, two plugs and a soldering iron and try different hookups until you get it right.

If you get into deep trouble, call the nearest junior high school student and he'll have you up and running in 15 minutes.

Wendell C. Putney
Greensboro, N.C.

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VIEWPOINT

Alternative jobs for the frazzled MIS manager



THE DATA CENTER

John P. Murray

Sometimes — probably not more than three times a week — when things get a little hectic and clients become unusually irate — often over matters of little consequence, such as project delays, the delivery of incorrect reports, slow network response times or the unavailability of the system — some of us think about putting our talents to a more effective use in some other area.

It seems reasonable to assume that many of us in the information processing profession share a number of similar skills, knowledge and interests. In addition, I suspect that because we are attracted to the work we share a number of personality traits.

Therefore, as a public service, I would like to present some viable options for career changes. I will add what I believe are pertinent comments to these various options to help you better analyze each opportunity given your particular interests and skills. I hope this material will benefit you in some way.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, published by Dow Jones-Irwin.

Some of these suggested new occupations may not readily come to mind and may indeed be considered somewhat unorthodox, but please bear in mind that you did not become an information processing specialist overnight. The application of effort and diligence will help you carry the day in any of these new areas.

Brain Surgeon. As I understand it, this line of work requires a large ego, and I think most of us in information processing would qualify. Also, as I understand it, this is a somewhat complex trade to master. You may want to start out nights and weekends and continue with your present occupation for a few weeks until you become comfortable. The pay is pretty good, and you get to work in a place that is clean and well lighted. True, some of you may consider spending your working hours with sick people depressing. However, considering that you have spent years with information processing clients, this is something to which you should be able to grow accustomed.

Symphony Conductor. The skill set required here, aside from some ability to read music — which is no real problem; anyone who can read a Cobol program can learn to read music really fast — involves being able to bring together a number of people and to mold them into a harmonious group working together to produce a high-quality end product. Well, on second thought, perhaps this may not be an ideal choice after all.

Hair Dresser. This may be the one for me. After all, people will always need their hair fixed up. The expense required to get started should be low:

Rent a storefront; put in some glass, chrome and pink chintz; buy a hair curler and some home permanent stuff; and the business is extant. You do need a degree of manual dexterity, not as much as you would for brain surgery, however. The years I spent handling punch cards made my fingers very supple, so that is not a problem.

From computers to curlers

The more I consider this occupation, the better it looks. I have picked the name "Mr. Jonnie's Hair Boutique." So, if you desire to get started in this line, pick some other name. However, don't despair, I may decide to make this a franchise operation — it could become the McDonald's of hair salons. If so, we can arrange to set up a "Mr. Jonnie's" in your area. Let me know soon if you are interested because I expect choice locations to go fast.

These are some career alternatives for us to consider when things get difficult. It is necessary that we become and remain aware of the requirement to carry out the appropriate planning, set goals and adopt a phased approach to this project so that success will at least be a reasonable prospect.

This list was designed to encourage those of you thinking of going across the street for a few dollars more to consider the full range of your options, to raise your sights, to broaden your horizons and to better appreciate the value of your special skills and experience so that you can at least consider some other profession where you can make a significant contribution.

IBM whets OA mart appetites, but when will it deliver?



WOHL STREET MINIJOURNAL

Amy Wohl

Confusion reigneth. The office automation customers who thought they had a secure strategy last year have been reading their tea leaves, reexamining any convenient crystal ball and stopping soothsayers in the streets, hoping to find out what to do.

The confusion stems from IBM's strong entry (IBM would say reentry, or continuing presence, I suspect) into the OA market last fall with new, additional or enhanced products, plus promises of a rosy future. IBM's marketing stance for these new products (especially the System/36 with Personal Computer workstations and software, but also PC Network and other products) has been aggressive enough to evoke howls of pain from competitors, cries for mercy from users and giggles of glee from consultants asked to explain the whole thing.

On the surface it's simple enough. Consider the following:

■ IBM has a game plan for "well-behaved" user organizations: They should start hooking their myriad personal computers together using System/36s to provide interconnection and systems-level OA functions. This strategy is limited by a number

of factors — software that hasn't hit its delivery date yet, the lack of integration across functions — but it is, at last, IBM's strategic OA product. Presumably, additional announcements this year and next will offer more workstations (a mysterious melody of "PC/2" wafts through the air), additional workstation and systems-level software and, eventually, attachment to the yet-unannounced IBM Token-Passing Daisy Ring network via Big Blue cables.

■ There is a nonstrategic (nonstrategic to IBM, that is) but fairly popular IBM alternative: attaching IBM Personal Computers to the IBM PC Network and using Microsoft Corp.'s DOS 3.1 and IBM Personal Computers as servers to create a local-area network. Sounds modern. But customers tell us IBM definitely downplays this alternative and, in fact, actually tries to convince customers that this is a short-term Band-Aid, aimed only at small groups of users who don't need a real OA system. In fact, we've never seen this actively proposed to a customer; it seems to be a fallback product for stubborn customers who insist on a local-area network installation now, not later.

■ Some IBM customers continue their Professional Office System (Profs) experiments under the VM banner. Although IBM has promised to hook Profs and the Distributed Office Support System together, the Profs world continues to attract mainly DP managers looking for easy-to-implement, low-level (low function, that is) OA solutions. Profs passes nearly no OA committee's eagle eye if delivered function is the measure of product selection.

■ The older IBM solutions still on the market are now perceived as ended games. The 8100 has never been a popular solution, and the 5520, as a nonprogrammable system, never really played in the OA world. Displaywriter will go "poof" as soon as IBM finishes the Displaywriter III software announcement for the Personal Computer with a secretarially acceptable keyboard. In any case, these products are not causing the commotion.

So what's going on?

In many cases, IBM has used the announcement of the System/36 OA Strategy to convince customers to reopen already-made OA decisions. This has wreaked havoc with competitors' revenue plans — to say nothing of their morale. There is nothing wrong with customers having one more look at the marketplace before making an important decision, but competitors claim IBM is having a chilling effect on their ability to market available and superior products. Meanwhile, IBM finishes making a series of announcements with delivery dates for a completed IBM product far in the future. (Industry analysts estimate that delivery of the IBM Token-Passing Daisy Ring network, for example, could be several years away, and so is the case for big pieces of the integration of function within the System/36.)

In fact, every major OA vendor is already offering a strategy similar to IBM's. They are attaching their own and IBM's personal computers as alternative, high-function workstations to minicomputers offering interconnection and systems-level functions: This is Digital Equipment

Corp.'s VAX with All-in-One, Data General Corp.'s MX plus CEO, Hewlett-Packard Co.'s HP 3000 with Interactive Office and Wang Laboratories, Inc.'s VS line with the Wang Office. All offer IBM Personal Computer support, although with a somewhat less functional integration than they can provide within their own personal computer offerings. These are mature OA products, with the normal accretion of software and software enhancements. All appear regularly on user organizations' short lists of preferred vendors.

The appearance of an IBM OA solution (strategic or not, final or not) seems like manna from heaven to users who are anxious to pick a vendor with whom to do business and to start installing something (anything) now — preferably something compatible with the de facto IBM Personal Computer standard that nearly every user organization has adopted. Users are once again saying, "No one ever got fired for picking IBM." And that, in itself, is soothing.

But will IBM offer users — especially large organizations with significant OA experience — satisfying solutions to meet their needs and high expectations? And when will these solutions arrive? Is a bird in the hand better than two bluebirds in the bush? Users are confused. IBM's competitors are harried and angry.

The story is still without an ending, but in a world where the ending can always be changed with a keystroke, permanence is an unexpected quality. Both IBM and its competitors will somehow muddle through this latest battle and live to fight another day.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of the "The Wohl Report on End-User Computing" newsletter.

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IN DEPTH

How compatible is it?

*The IBM Personal
Computer clones advertise
compatibility. Here's
the meaning behind what
they claim.*

By Stephanie DiDonato

The microcomputer marketplace is inundated with vendors claiming various degrees of hardware and software compatibility with the IBM Personal Computer. Unfortunately, there is almost no consistency among their interpretations of what compatibility entails. One manufacturer might not claim compatibility, even though its system runs Microsoft Corp.'s MS-DOS and can read and write in IBM-compatible data format. Another vendor may claim that its system is compatible because it runs MS-DOS, totally disregarding the



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IN DEPTH/COMPATIBLES

fact that data is read and written in a different format on different capacity diskettes.

Users need to ask the following questions in order to assess a system:

■ Can I run all versions of IBM's PC-DOS on the compatible system?

■ Are the central processors in the two systems compatible? Are they based on the same or related microprocessors?

■ Can I take an IBM board or a board-level option, such as the color graphics display adapter or the expansion box, and plug it into my compatible system?

■ Is the compatible's keyboard identical to the keyboard supplied by IBM? If the compatible features additional keys, how do they affect the compatibility of programs or data generated with/without the use of these keys?

■ Can I take IBM programs that use the Personal Computer graphics features and run them on my system?

■ Will the compatible system read from and write to diskettes taken from the IBM Personal Computer without changes or conversion first? Will the IBM Personal Computer read from and write to diskettes taken from the compatible without first making alterations?

Software compatibility

Microcomputer operating software tends to be closely related to the CPU and I/O structure of a system; therefore, it's not completely portable.

When buying a software program designed to run, for example, under MS-DOS, make sure to find out which implementation of MS-DOS IBM's

PC-DOS is just one of many.

There are significant differences in capability among the four major upward-compatible software levels available to users of the Personal Computer — between systems controlled by read-only memory (ROM) Basic without MS-DOS or any other operating system, PC-DOS 1.1, PC-DOS 2.0 or 2.1 and PC-DOS 3.0 or 3.1.

PC-DOS 2.1 is very similar to (and replaces) PC-DOS 2.0; it includes several fixes and extensions of enhancements introduced for 2.0. DOS 3.0 is an enhancement over DOS 2.1 and is being replaced by DOS 3.1. DOS 3.1 will provide all 3.0 capabilities and support the IBM PC Network. Neither replaces DOS 2.1.

These four levels are largely upward compatible. Programs designed to run on a Basic system can usually run on a DOS system but not the

reverse; programs designed to run on DOS 1.1 systems can usually run under DOS 2.X and DOS 3.X but not the reverse. Furthermore, DOS 1.1 cannot handle hard disks and consequently cannot run on the Personal Computer XT; it also is not supported by the Personal Computer AT.

DOS 2.0 runs on the IBM Personal Computer and Personal Computer XT diskette-based or hard disk-based models. It has been replaced by DOS 2.1, which runs on PCjr diskette-based systems as well as on the other Personal Computers and the Personal Computer AT. DOS 3.0 and 3.1 support the Personal Computer AT as well as all other IBM personal computer models.

Other operating environments, such as CP/M86 and Concurrent CP/M are also available for the Personal Computer, but the primary focus of IBM and its competition has been the development of PC-DOS versions of the MS-DOS environments.

Can I run all versions of IBM's PC-DOS on the compatible system?

IBM's PC-DOS is a modified version of Microsoft's MS-DOS. MS-DOS is a fairly transportable generic operating system designed to run on the Intel Corp. 8088/8086 microprocessors or their 80188/80186 and 80286 counterparts. Because it must adapt itself to an individual architecture, incompatibilities are likely to arise between one MS-DOS system and another. These incompatibilities can conceivably be circumvented, however, through software and/or firmware adjustments, if the vendor wants to put in the effort.

MS-DOS has its own Basic I/O subsystem (Bios), which was designed to be implemented in user ROMs in a manner consistent with the vendor's developing architecture. A compatible vendor must implement this Bios in such a way that it is not identical to IBM's proprietary ROM Bios code, yet provides the same functionality and interfaces in a manner totally transparent to the user's hardware and software.

The Bios contains code for the operating system bootstrap, for system checkout and testing, for interrupt vectors allowing Bios-level interfacing for I/O manipulation and for the initialization of memory, interrupt vectors, scratchpad, I/O and flag values. It is particularly important that ROM Bios interrupt vectors are initialized to point to the same functions found on the Personal Computer.

As is the case with the more advanced Basic interpreters for diskette- and disk-based systems, IBM uses the existing (cassette-level) ROM Bios together with a tailored software Bios to achieve the equivalent of all the software Bios-supplied with MS-DOS. A vendor can implement this in various combinations of ROM and random-access memory (RAM) as long as certain addressing, interrupt and memory constraints are respected.

Another essential problem in trying to achieve software compatibility is that the vendor is always shooting at a moving target. As the primary vendor improves on or expands the system's capabilities, new operating system releases (or new Basic releases) may be needed to exploit fully the expanded capabilities. A program designed to run under the old operating system release may not run under the new one without modification.



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IN DEPTH/COMPATIBLES

For example, IBM's PC-DOS 2.X releases were developed with the introduction of the Personal Computer XT and PCjr respectively, while PC-DOS 3.X was unveiled with the Personal Computer AT, but all will run on the original Personal Computer. When IBM announced PC-DOS 2.1, it stopped selling PC-DOS 2.0 altogether and later PC-DOS 1.1. Yet certain programs developed for operation under PC-DOS 1.1 will not run without modification under PC-DOS 2.0 or 2.1; IBM published a list of these when it announced PC-DOS 2.0.

The issue of compatibility might not be so difficult to resolve if compatible hardware and software vendors would be more precise as to the specific operating system versions for which compatibility is claimed.

Hardware compatibility with the Personal Computer is manifested in several ways — through the CPU, the expansion slots, the disk drives, the keyboard and the display. If any of these areas don't conform with the Personal Computer, then the system will not be completely compatible.

Are the central processors in the two systems compatible? Are they based on the same or related microprocessors?

The CPU in a microcomputer system is usually equated with the primary microprocessor used to execute the primary instruction stream. For the Personal Computer, the primary microprocessor is an Intel 8088, which is part of a compatible family that includes 8085, 8086, 80188, 80186 and 80286 8-bit and 16-bit chips.

It is conceivable that a fully Personal Computer-compatible microcomputer system could be designed with any of these chips by firmware or software programming around differences in implementation of essential functions. The 80188 was specifically designed as an upgrade to the 8088; the 8086's difference in data bus width is compensated for by almost identical interfacing to the bus.

The Personal Computer AT implementation of the 80286, however, is experiencing some compatibility problems. Nevertheless, almost all currently delivered systems that claim full compatibility (hardware, code, disk, keyboard, I/O, software) use the 8088 as a base. It seems

logical that a company primarily interested in marketing a highly compatible system would choose the 8088, which is identical to IBM's microprocessors, and thus cut back on the compatibility adaptations needed. On the other hand, if a company wants to implement an MS-DOS system with disk/data compatibility and enhanced features over what IBM offers, the logical choice is the more powerful 8086, 80186 and 80286 processors.

The compatibility of the basic microprocessor component is only the first issue. If a vendor says a system is based on an Intel 8088, he does not usually mention that the interrupt control logic, CPU timer, direct memory access control and so on are on separate microprocessor chips. The user is presented with a system having numerous hooks for direct interaction with basic peripherals and systems software.

The software as it is currently implemented is also open to some adaptation and alteration by the user. The variety of entrances and exits to and from the IBM code and the possibility of implementing changes that IBM may later implement in a different manner means that developing a highly compatible personal computer is difficult. The systems cannot be identical and do not have to be, but they should function as if they were.

Can I take an IBM board or board-level option, such as the color/graphics display adapter or the expansion box, and plug it into my compatible system?

The question of whether a compatible system can add board-level options and I/O slots is easy to determine because there is an obvious physical interface that probably would not be implemented without associated logic support. In the most compatible systems, the basic system unit can accept IBM boards, includ-

ing the board that allows attachment of the IBM expansion unit for adding hard disk and additional I/O slots. Corona Data Systems, Compaq and Columbia Data Products, Inc. are examples. (Columbia Data Products recently filed for protection under Chapter 11 [CW, May 13]).

At a second level, the compatible system does not itself accept IBM add-on boards but instead attaches to a special expansion unit through a compatible bus interface. The expansion unit accepts the IBM boards. This method of attachment is used by the Seequa Computer Chameleon. In this case, the 8288 bus controller chip and the 8237 direct memory access controller chip or their compatible counterparts would be likely control modules.

At another level, the presence of a compatible physical interface (in other words, parallel printer port) does not mean that a device can be attached and run. A compatible I/O driver for the specific device must exist in the system or be added.

The physical attachment of I/O devices can incur unexpected obstacles. For instance, when IBM unveiled the Personal Computer XT with eight slots (as opposed to five slots in the Personal Computer), the slots were positioned more closely together in the XT system unit than in the Personal Computer. IBM boards fit, but some boards made by third-party vendors were too thick, especially if they had a piggyback option.

Is the compatible keyboard identical to the keyboard supplied by IBM? If there are additional keys on the compatible system, how do they affect the compatibility of programs or data generated using these keys?

The consideration of keyboard compatibility between the Personal Computer and its look-alikes has two facets — the man-machine interface

and the system compatibility interface.

The 83-key, Personal Computer keyboard deviates from the familiar IBM Selectric keyboard in a number of ways that many users find annoying. Most irritating is that the left shift lock is not in its traditional place next to Z, but is one key over, after a backslash key. Some users don't like the function keys placed in a pad to the left; they would prefer them in a row across the top of the keyboard.

The issue of what a single user prefers, however, is complicated further when multiple systems are used in a business setting, and people find themselves using different micros at different times. If each has a different keyboard layout, the user's conditioned responses are snarled, and error rates and irritation rise while throughput goes down.

To combat this problem, vendors aiming at compatibility usually supply a keyboard identical to IBM's in spite of known problems. If alternative layouts are supplied, they usually move toward the standard Selectric layout. Some vendors supply more than one alternative.

To what extent are alternative layouts likely to be incompatible? The answer is that a change in position is unlikely to cause problems, but the addition of new functions may or may not. IBM's method of implementing keyboard-to-CPU communications is highly amenable to software alterations. No individual key produces a single code that is translated directly to an Ascii equivalent; instead, two codes are produced, one as the key is struck and one as it is released.

The codes are collected in a 20-char. buffer that is controlled by a separate microprocessor chip, the 8048, as well as ROM Bios. Bios processes the single keystrokes or keystroke combinations that generate legal Personal Computer codes — a 256-byte-extended Ascii character set plus 40 function key codes.

The 8048 monitors and reports keyboard activity, generates a Bios interrupt for every key action, notifies the user if the buffer is full and the system isn't responding to interrupts and performs diagnostics.

This indirect path between the keyboard signals and the generation

(Continued on Page 50)

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IN DEPTH/COMPATIBLES

A guide to the chart

Many vendors claim IBM Personal Computer compatibility, and there are various levels of compatibility. The Data Decisions chart on the opposite page points to products with specific capabilities.

When examining this information, it's important to bear in mind the three levels of Personal Computer compatibility:

Personal Computer compatibility. These systems run most IBM Personal Computer software packages, use the Intel Corp. 8088 microprocessor, accept IBM peripheral cards, can read/write IBM disks and have the same user interfaces for the display, keyboard and sound. This group can be subdivided into the

highest degree of compatible systems, which includes machines that run 98% of Personal Computer software, and lower levels, which include systems that have problems running some of the programs, mostly in the graphics area. These lower level systems also may accept most, but not all, of the Personal Computer expansion boards.

Data compatibility. These systems usually don't run major IBM programs. They can't use IBM expansion cards and have different user interfaces. What they can do is either read or read/write IBM data files.

MS-DOS compatibility. Systems in this group can't even swap data

disks without converting the disk media.

The chart presents an overview of the most popular Personal Computer-compatible systems on the market. Many of the systems have not yet been fully tested by Data Decisions. Therefore, their level of compatibility is based solely on vendor specifications and claims.

If you plan to purchase a compatible, you should test the system for yourself before making a final decision.

The column headings going across the top of the chart address issues of hardware compatibility and system configuration.

Compatible expansion slots. If a

system accepts Personal Computer expansion cards, the number of available compatible slots is shown. A "0" indicates that although the system isn't board compatible, it has slots for noncompatibles — or that it does not have expansion slots in the unit but can attach a compatible expansion chassis. The Comments section indicates which is the case.

Graphics compatible. This category shows what systems utilize the same graphics capability as the Personal Computer, either as a standard feature or system option.

CPU speed. This shows the CPU speed in MHz. If a system has more than one speed, the fastest speed is shown, and the Comments section will indicate that it is switch selectable.

Processors. Indicates what CPU a system runs under, what systems use an 8-bit co-processor for running CP/M applications and whether a system has an 8087 socket for implementing an Intel 8087 for faster numeric processing.

Memory. Shows the amount of memory a system comes with in its base configuration, how much memory can be placed on the mother-board before having to use expansion slots and the maximum amount of memory a system can handle.

Ports. Shows how many serial and/or parallel ports a system provides as part of its base configuration.

Hard disk. Shows which systems include a hard disk in their base configurations.

Bundled software. Indicates what type of software is included in the system price.

Base configuration. Shows what components are included in a system's entry-level model.

Price range. Indicates a system's base price range.

Comments. Any relevant information not presented in the chart is shown in this section.



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A sample of IBM compatibles

Source: Data Decisions.

IN DEPTH/COMPATIBLES

(Continued from Page 47)

of characters means that the keyboard character set can be easily redefined; changed key positions can be coded by means of software and new function codes entered.

The problem with this flexibility is that if a vendor makes use of it to assign unique functions to unused code combinations, the software can become incompatible if IBM assigns a standard function. The bright side is that compatible vendors are unlikely to have great difficulties designing compatible keyboards or implementing a fix for a bug.

Can I take IBM programs that use the Personal Computer graphics feature and run them on my compatible system?

When IBM introduced the Personal Computer, it also offered two graphics boards for use with the system. The monochrome board provides a resolution of 640 by 200 pixels while the color board offers 320 by 200 pixels in four colors. Because the boards were from IBM, they quickly became the standard to which most graphics packages were written.

Many people felt that these graphics capabilities were less than the best possible considering the current state of the art. Consequently, many vendors that preserved compatibility in most respects chose to implement a system with better but incompatible graphics resolution. Adding more pixels per square inch creates a sharper character image and plot-line, but it creates problems for software that addresses either 640 or 320 by 200 pixels.

This type of incompatibility is common among IBM competitors that otherwise call themselves compatible; they provide incompatible enhancements. Some manufacturers have found solutions that combine the best of both worlds. The Corona personal computer, for example, features 1,280 by 325 pixels but addresses 640 by 325; each X-axis instruction parameter relates to 2 pixels, which is easily adapted to IBM compatibility.

That still leaves compatibility problems on the Y-axis. The logic provided by Corona manipulates all 325 pixels independently and, therefore, it is incompatible. To compensate, the system was designed so that someone who wants to run a program that uses compatible graphics can add one of the IBM graphics boards; the display is then manipulated as if there were only 640 or 320 by 200 pixels.

Will the compatible system read from and write to diskettes taken from the Personal Computer without changes or conversion first? Will the Personal Computer read from and write to diskettes taken from the compatible without first making alterations?

IBM offered cassette storage connection capabilities on the original Personal Computer but never supplied a drive; the ability to connect a cassette drive is not even offered on the other Personal Computer models.

Even on systems with larger fixed hard disks, the diskette drive is used to load programs, store data off-line and back up the fixed disk. A streaming tape drive might be more logical for backup, but a tape drive is usually more expensive and not as flexible as the diskette drive because diskettes can be accessed randomly and are easier to mail.

Data on the diskette drive, moreover, is usually recorded in the same format or a subset of the format used on the hard disk; each is preformatted and generally accessed through the same basic logic and tables that control the fixed disk. When inquiring about disk compatibility, the user refers to both disk and diskette media and tends to focus on the removable, exchangeable diskette.

For diskettes from different systems to be fully compatible, they must be compatible in four ways. First, they have to be the same size. Second, the data records have to be recorded in the same machine code (Ascii, Ebcidic) and use the same basic file and record organization with the same headers and pointers. Third, the way the data track is formatted on the diskette has to fit the operational characteristics of the

drives on both systems. Fourth, the access logic in the system and running program must match the organization of the directories on the diskette or the system can hang up.

Physical compatibility

IBM Personal Computers store data on 5¼-in. floppy disk media, but many other systems use higher capacity 8-in. or more portable 3½-in. media. The first level of diskette compatibility is easy to determine — whether both systems can read diskettes of the same size.

Because PC-DOS is a variation of MS-DOS, both systems use the same Ascii code set and organize records in a similar manner, which is reflected in the diskette records. Headers, trailers, record delimiters and so on are common to both systems, and the same basic instruction types are used

to manipulate files.

PC-DOS and MS-DOS have comparable features for user manipulation of files, tracks and sectors. A notable difference is that the IBM Personal Computer stores elements of the Basic I/O system, including most of the disk handling logic, in a proprietary ROM. This ROM's functions must be duplicated, preserving the same entry points without duplicating the IBM codes exactly — a tricky but not impossible proposition.

Because the read/write operations for the diskette drives were designed to be firmware- and software-controlled and are accessible to the user, it is possible to manipulate the recording format and density to some extent without sacrificing compatibility. In fact, IBM itself has done so. Under DOS 1.1, diskettes are formatted at eight sectors per track, 40

INTELL



IN DEPTH/COMPATIBLES

tracks per side, whereas under DOS 2.X and 3.X there are nine sectors per track.

In all cases, 128K-, 512K or 1,024K bytes can be set as the sector size, with the result that diskettes recorded under DOS 2.X and 3.X can have a capacity of 360K bytes, whereas DOS 1.1 diskettes have a maximum of only 320K bytes. DOS 2.X and 3.X were designed to recognize automatically how the diskette has been formatted and to read it accordingly.

The 80186-based Pronto 16 MS-DOS system attaches disk drives designed to record 5¼-in. diskettes at twice the number of tracks per inch as the IBM personal computers. Instead of the 48-track/in. Personal Computer spacing with 40 tracks for recording data, the Pronto 16 was designed to record at a 96-track/in. spacing with 80 tracks for recording

data.

The controller identifies the 96 track/in. recording as a double-density mode and can also record in a single-density, 48 track/in. mode. By skipping the odd-numbered tracks, the controller can read or write in compatible format, and the manufacturer can provide twice the capacity without sacrificing IBM media compatibility. The Pronto 16 user can read IBM diskettes without difficulty, all other things being equal, and can write equally compatible diskettes by using single-density mode. However, if the double-density mode is used, that diskette cannot be read into an IBM system — it will have to be copied onto two single-density diskettes.

Each diskette and disk contains a directory of its contents. The logic for control of the directories is in-

cluded in generic MS-DOS-Bios, but with PC-DOS, most of it resides in IBM's proprietary Bios ROM. DOS 1.1, equivalent to MS-DOS 1.25, was oriented toward systems with diskette storage but no hard disk. Diskette files were accessed through a single directory, an adequate access structure for that medium.

On the other hand, PC-DOS 2.0 and higher, as well as their MS-DOS counterparts, supply a combined partitioning and hierarchical-free structure for disk access. The partitioning allows a disk to be divided among multiple operating systems. The tree structure provides for multiple subdirectories, and it can define a variety of access paths through the directories. This routing mechanism allows a sharing of common code and data (with some limitations) and a flexible upper limit to the virtual

partition size created by the path.

Unfortunately, software for PC-DOS 1.1 that has not been updated to support the hard disk won't recognize pointers that lead to subdirectories. The program often can run on the hard disk but must use the single-level type of directory, which is usually unwieldy for a storage medium the size of the fixed disk.

PC-DOS 2.0 and higher can run on diskette-based systems using the ROM chip originally delivered for the Personal Computer. However, if an expansion unit with hard disk is added to the system, one of the elements of the installation package is a new ROM chip with the fixed disk driver on it. A user could buy the expansion box fixed disk and plug it into a compatible system, but it wouldn't work unless it was running under the newer IBM-supplied chip. Third-party vendors still supply fixed disks with software drivers that run in conjunction with the original Personal Computer ROM chip rather than the new one.

Preliminary assessment

The micro user is faced with a marketplace that has not yet developed comprehensive, clear-cut standards — or even traditions that serve as substitutes for formal standards. In some cases, however, de facto standards have been formalized because of widespread implementation. For example, most systems have a standard RS-232C interface and a Centronics Data Computer Corp.-compatible parallel printer port. On the other hand, CP/M, MS-DOS and Unix may be highly portable, but their implementation is hardly standardized.

If they are to stay in business, compatible vendors at any level of the market must offer the user price advantages and equivalent or better reliability vs. the Personal Computer. And the most successful usually offer more prompt delivery and more responsive service as well.

Compatible vendors must establish an identity for their product, so they offer additional attractions. Some features do not affect compatibility; others might. The following discussion of typical enhancements focuses on their impact on compatibility:

Portability or other physical packaging alterations. A number of vendors offer portable systems complete with display, diskette drives, keyboard and system unit. Portability doesn't have to affect compatibility at all, nor does any other alteration to the physical housing.

Improved ergonomic display design. The background, color and manipulative characteristics of the display, as well as nonglare features and physical size of the screen, do not affect compatibility.

Increased resolution of display. The display resolution can be improved by increasing the number of picture elements (pixels) per square inch, which makes alphabetic and numeric character shapes clearer and more distinct. Unfortunately, this enhancement can and usually does affect compatibility. However, if the change involves a fixed formula that automatically changes IBM's 640- by 200-point addressable graphics matrix (into a 1,280- by 400- or 1,280- by 600-point matrix, for example), it can be manipulated. This distinction is an important factor when evaluating compatibility.

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Increasing CPU clock speed. This practice is fairly common and only creates problems for time-dependent programs.

Increased memory capacity. Increasing the memory in the basic system doesn't change the compatibility of a vendor's product, but increasing memory beyond IBM's limit might do so. The Personal Computer allows addressing up to 1M byte, but some of those addresses are used for system functions that are not supposed to be accessed directly by the user. The 640K-byte Personal Computer limit for user memory is large enough for a single-user/single-tasking system, and most alternative vendors do not exceed it.

Increasing diskette capacity. The Personal Computer line handles 160K, 320K or 360K bytes of diskette capacity, depending on the drive

model and operating system release. In almost all cases, any change in diskette size, capacity, file handling, formatting or directories will affect media compatibility. The exception is when a drive and its supporting software are engineered to read and write Personal Computer densities as well as the larger density.

Changes in keyboard design. Changes in a keyboard's physical characteristics, such as touch sensitivity, shape of keyboard top, color coding of key caps, positioning of keys and movability and tiltability of the keyboard unit, do not affect compatibility. Adding function keys may or may not affect compatibility and probably won't because they are entered into the system by a two-level process that lets the user manipulate the software and translate the keyboard input into standard

system instructions.

Adding to the number of slots, RS-232C or parallel printer ports. In and of themselves, these changes do not create problems, provided the devices can be addressed. However, there may be problems with the software that directly addresses machine elements.

Combining logic cards. Many compatible vendors provide a display control card that combines the functions of the monochrome and graphics display control cards, which are separate for all Personal Computer systems except the 3270 PC. This doesn't affect compatibility and saves I/O slot positions; in fact, this compaction is a favorite device of vendors competing with IBM.

Implementing a RAM disk. PC-DOS 2.0 and higher and MS-DOS 2.0 and higher implement a RAM disk,

but PC-DOS 1.1 and MS-DOS 1.25 do not. Certain compatible vendors include RAM disk capability in their version of MS-DOS 1.25. This addition may or may not affect compatibility with programs designed to run under PC-DOS 1.1; in the case of Columbia Data Products and Corona systems, for instance, it does not.

Current compatibility

Users and industry analysts tend to divide the compatibles marketplace into three broad divisions and assume that the systems run some version of MS-DOS and are based on an 8088, 8086, 80186 or other compatible member of the Intel 8088 family of microprocessors. These divisions are MS-DOS compatible only, disk/data compatible and Personal Computer compatible.

MS-DOS compatible only. This

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Incompatibility in programs

The purchase of programs is an ongoing process. When you own a compatible system, it is still necessary to test software designed to be compatible. These are some of the items to look for when determining if a program is incompatible:

Programs using the all-points addressable graphics facility. Because IBM's graphics capabilities leave something to be desired, this area is a favorite point of departure for vendors who are partially compatible with IBM. Spreadsheets, games and other graphics-related programs must be investigated carefully if you plan to run them on a compatible machine. If the compatible uses the same graphics resolution as an IBM graphics board the programs should run.

Programs that directly address ROM. Although neither IBM PC-DOS nor Microsoft MS-DOS programming guidelines allow direct ROM calls, specifications on the Personal Computer interrupt system and assembly language implementation provide plenty of information on how to do it. As a result, programs with embedded direct ROM calls are likely to hang up even on the most compatible of systems, because IBM's ROM is proprietary. Fortunately, most large business software vendors are interested in making their programs as portable as possible and tend to avoid ROM calls. These are more likely to occur in programs that enhance or supplement a particular Personal Computer function or in game programs.

Programs that directly address Personal Computer machine components. Because IBM provides elaborate details on the interrupt system, programmers can directly address machine elements in their programs. This is not a problem if the compatible vendor uses exactly the same chips to implement the direct memory access controller, timer, keyboard controller, serial I/O controller and so on. Each of these is actually a special-purpose microprocessor with its own instruction set. However, if the manufacturer chooses another chip, these types of programs may not run.

IN DEPTH/COMPATIBLES

broad group of systems runs MS-DOS, but there is no particular effort to be compatible. Certain programs that run on the Personal Computer can run on these systems because they use only the code common to MS-DOS and PC-DOS — in other words, they are highly device-independent. They will not directly address ROM, for example, and usually do not use graphics.

Because certain Personal Computer programs do run on the system, the vendor may claim some compatibility. Usually, however, the specifications for these systems show differences in diskette media size or capacity, differences in graphics pixels, a different keyboard or different character capacity and format on displays. These systems do not attach IBM peripheral cards; if these vendors were interested in that degree of compatibility, they would have included disk/data compatibility — which is easier to implement.

This level of compatibility has been labeled MS-DOS compatible or incompatible. Only a stray manufacturer or two calls the system compatible because most manufacturers of this type of system see a marketing advantage in having a distinct identity. These vendors will usually say that their product is not a "me-too" product.

Disk/data compatible. The second large group of systems can read and write disks in the format used by the Personal Computer and use the same physical size diskette. They will produce 5¼-in. diskettes with a capacity of 160K, 320K or 360K bytes depending on the MS-DOS version implemented and whether or not the diskette is single- or double-sided. Sectoring will be the same. Headers, trailers and directories also will be the same, with the qualification that certain compatibility problems will arise among diskettes with multiple subdirectories recorded under MS-DOS 2.0/3.0 or PC-DOS 2.X/3.X and single directories recorded under MS-DOS 1.25 or PC-DOS 1.1.

This level of compatibility has been labeled disk compatible, data compatible or media compatible and, of course, Personal Computer compatible. It is a level that is fairly easy to implement because the basic software structures are already in place in MS-DOS. The manufacturer only needs to add a 5¼-in. diskette drive and some coding to implement it in addition to features already on the system.

Personal Computer-compatible systems. Systems that are fully or almost fully compatible with existing hardware and software include the ability to attach Personal Computer expansion boards and run Personal Computer software. The keyboard may be identical as well as compatible; the disk is compatible; the system runs most nongraphics and some graphics software; it usually can run interpretive Basic with graphics as well as compiled Basic; and it can run all versions of PC-DOS. If the system doesn't quite meet these standards, the point of variance usually is with the graphics capabilities and the ability to run interpretive Basic with graphics. Systems with this level of compatibility have been labeled system compatible, operationally compatible, truly compatible and naturally Personal Computer compatible.

Clearly, PC-DOS has a lot of capability for supporting machine-depen-

dent features, and even the most compatible system could hang up on a program that directly calls ROM — even if the compatible system has all ROM entry points at the same locations as IBM's. It is also possible for a compatible vendor to design ROM code to function like the Personal Computer ROM code without violating IBM copyrights.

The Compaq Portable, the first compatible to achieve a sizable installed base, is considered the compatibility standard. Corona Data Systems, another veteran in this market, has also achieved excellent marks on compatibility. The Corona system has incompatible graphics features but can operate in a fully compatible graphics mode if the IBM graphics board is installed.

Wang Laboratories, Inc. recently announced four desktop machines

offering software compatibility with the IBM Personal Computer [CW, May 13]. The models add IBM monochrome display emulation capability to standard Wang Professional Computer configurations. The desktops feature an 8086 processor, 256K bytes of RAM, MS-DOS 2.1 and Basic. Expansion slots are compatible with Wang's Professional Computer. Wang also announced an IBM Personal Computer color and graphics emulation option and an Intel 8087-2 numeric coprocessor.

Word of caution

Whenever we talk about compatibility, we include MS-DOS systems that are disk/data compatible and those that can attach Personal Computer boards. Both these levels can run more Personal Computer software than systems supporting MS-

DOS compatibility. Compaq, the system generally accepted as the most compatible, runs PC-DOS and IBM-supplied systems software.

However, it would be wise to test every program, even on a Compaq.

The two favorite testing vehicles are Microsoft's Flight Simulator and Lotus Development Corp.'s 1-2-3.

About the author

Stephanie Di Donato is a senior editor/analyst for Data Decisions, a market research firm. The material in this article was taken from "Microcomputers Systems," a three-volume monthly updated reference service that provides hands-on evaluations of micro communications hardware and software products. Microcomputers Systems is published by Data Decisions, 20 Brace Road, Cherry Hill, N.J. 08034.

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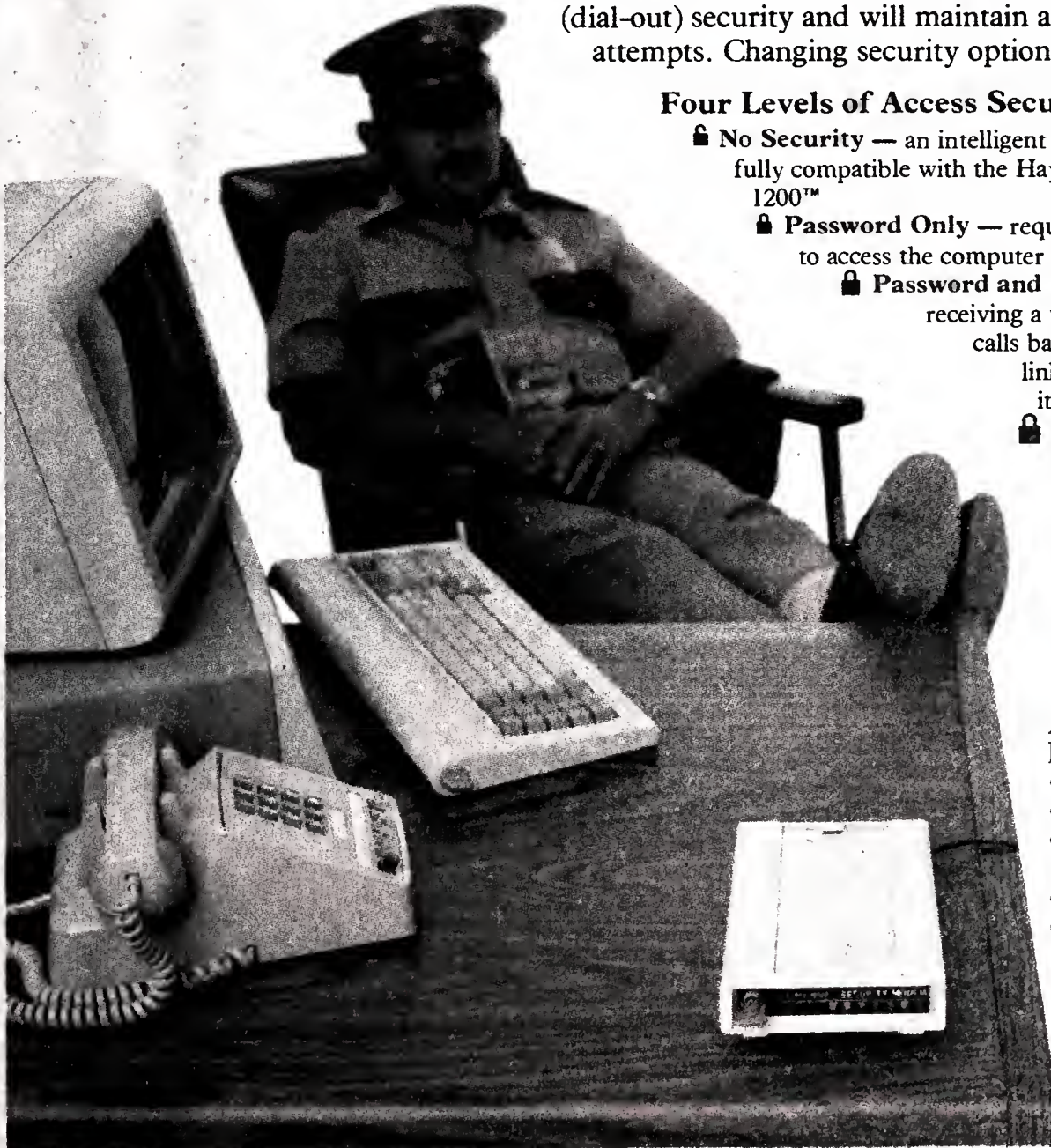
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SOFTWARE & SERVICES

SQL users give mixed reviews

By John Gallant
CW Staff

NEWBURY, England — Overall, users gave high marks to IBM's SQL relational query system, but they questioned its usefulness to non-DP professionals — the very audience to which IBM targets the product.

That was the finding of a recent Xephon Technology Transfer Ltd. study of SQL users at 37 U.S. sites. According to Xephon, headquartered here, SQL is most commonly used by applications programmers and least used by senior managers. Many respondents commented on end-user difficulties encountered when using SQL.

"IBM aims its relational query system squarely at non-DP professionals — DP professionals are not listed among the primary users suggested for SQL in IBM's 'Systems and Products Guide,' Xephon stated. "But [the survey] casts some doubt on the package's suitability for end users without DP training."

In addition, the survey indicated, SQL performance was a problem for users, particularly terminal response time and processor overhead. Users cited faster systems development as the primary benefit of SQL use, and they listed its lower cost, compared with functionally similar products, and reliability as top benefits.

Xephon also asked users to list the factors that influenced their selection of SQL. The most commonly expressed factor was that SQL is an IBM product, benefiting from Big Blue's "strength, support and di-

See SQL page 66

A program for teamwork



SOFTALK

John Gallant
CW Senior Editor

What do programmers, engineers and certain athletes have in common?

According to J. Daniel Couger, they are intensely individualistic, thrive on challenge, have a lower need for social interaction and are motivated by their work rather than such factors as pay, fringe

benefits or job security. But despite their solitary, self-motivated nature, they are usually required to work within a team structure. Couger, distinguished professor of computer and management science at the University of Colorado at Colorado Springs, is involved in research into the workings of programming teams and the hazards that befall them.

"Professionally, engineering is the closest thing to programming," Couger said "In athletics, the equivalent to the programming

See TEAM page 71

■ CDBC unleashed a remote micro link to its mainframe financial applications/58

■ Iskra Software International gave DEC minis an applications generator/58

■ Linkware extended its communications software to AT&T's Unix and IBM's MVS operating systems/58

■ Future Software unveiled an IBM mainframe spreadsheet dubbed FutureCalc/59

INSIDE

Systems
Software/59

Productivity Aids/63

Application
Packages/63

DBMS/64

Languages/70

MEMORABILIA

'Artificial intelligence as a term sounds kind of intriguing, a little mysterious and maybe even a little eerie. It has that kind of peculiar fascination and allure that words like supernatural, phantasm, occult and martian have — things fathomable but still otherworldly. AI makes perfect cocktail conversation if you know the right buzzwords.'

Harvey Newquist III
DM Data, Inc.'s 'AI Trends' newsletter

SOFTLINE/SHAKU ATRE

Will the real fourth-generation languages please stand up?

Has the era of fourth-generation languages already arrived, or is it just approaching?

A critical look at the evolution of programming languages shows that first-generation software supported sequential processing of one instruction at a time. Today, software supports sequential instruction-by-instruction processing but at a much faster rate than 10 or 15 years ago.

First-generation software came into existence in the late 1950s and early '60s. It was characterized by machine-oriented languages and assembly languages such as Basic Assembly Language.

Second-generation languages, which became popular in the early 1960s, can be described as compiled programs that run using a command language. For example, early versions of Fortran were

dependent on JCL for the IBM 360.

Third-generation languages with data abstraction capabilities and control of asynchronous processes also arrived during the early '60s. These languages included Cobol, PL/1 and Pascal.

Each generation of languages has improved on the ease of use and capabilities of its predecessors. Since the third generation, generation 3.5 languages

See SOFTLINE page 70

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SOFTWARE & SERVICES

CDBC unveils link tool for IBM micros

GREENWICH, Conn. — Control Data Business Centers, Inc. (CDBC) has announced microcomputer-mainframe link software that gives remote personal computer users access to accounting and financial applications running on CDBC's mainframes.

Dubbed Orchestrator, the software gives IBM Personal Computer AT and XT users a two-way link to CDBC's mainframes running payroll, accounts receivable and payable and general ledger systems. Orchestrator reportedly provides user companies with a common data base that can be accessed by different departments through micros. Applications of Orchestrator include payroll processing, payroll tax filing, automatic tax changes and benefits administration.

Orchestrator consists of a telecommunications program, user security software, four data entry modules, automatic file translation, backup and restoration programs, printer support software and report backup, restoration and deletion. It requires 320K bytes of random-

access memory and an RS-232 serial port. It comes with four 5¼-in. diskettes that work under IBM's PC-DOS 2.0. Telephone hookup requires a 1,200 bit/sec. asynchronous modem with autodial capabilities.

The spokesman said the product can be used to communicate with CDBC mainframes at any time of the day and transmits and disconnects automatically.

The menu-driven software automatically edits entered data, the spokesman said. Data is available after processing by the host for downloading, storage and manipulation in the micro. Processed work, including reports and payroll checks, reportedly is available the next day.

Orchestrator is available through two basic options: a one-time license fee of \$3,600 or a monthly payment of \$150. CDBC also charges a software maintenance fee of \$35 per month. Host processing rates vary, based on volume of processing.

CDBC can be reached through P.O. Box 7100, 500 W. Putnam Ave., Greenwich, Conn. 06836.

DEC systems get Formatix

FARMINGDALE, N.Y. — Iskra Software International has introduced an applications generator for Digital Equipment Corp.'s VAX and PDP-11 processors.

Formatix generates documentation as it develops the application, a spokesman said. The menu function allows users to combine programs generated by Formatix with programs written in other languages.

Users can begin application generation by describing the features they need generated. Menus can be formed to create, review, update, generate reports, make inquiries and provide help.

Formatix is priced from \$1,700 on DEC's Microvax to \$9,800 on the VAX-11/780.

Iskra Software International is located at 222 Sherwood Ave., Farmingdale, N.Y. 11735.

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Linkware versions debut for MVS, Unix

WALTHAM, Mass. — Linkware Corp. has announced that its micro-mainframe software now runs under IBM's MVS/TSO and the University of California at Berkeley's Unix operating systems. The company also announced Version 1.5 of its PC Connection product.

The Linkware Information Server, formerly available for IBM VM and Digital Equipment Corp.'s VMS operating systems, includes Linkware's data transformation facilities that transform host files into personal computer formats, according to a spokesman.

The MVS and Unix versions of Linkware Information Server each include command line interfaces to allow host-terminal users to exchange files via Linkware's Central Server with dissimilar personal computers.

A security facility allows management to control user access privileges and generates an audit trail of user requests to Linkware, the spokesman said.

The MVS/TSO version of the Linkware Information Server costs \$35,000 per CPU. Unix versions range from \$6,000 to \$18,000, depending on configuration.

Linkware's PC Connection Version 1.5 is now available for Data General Corp.'s DG/One and Wang Laboratories, Inc.'s Wang Professional Computer.

The product, formerly available for the DEC Rainbow and IBM Personal Computer and compatible machines, automatically reformats information being transferred between the mainframe and microcomputer. Logon features have also been enhanced, the vendor said.

Linkware's PC Connection costs \$10,000 for each make of hardware running it.

Linkware is located at 77 Rumford Ave., Waltham, Mass. 02154.

SOFTWARE & SERVICES

SYSTEMS SOFTWARE

■ **Datamate Co.** has announced that its **Fastfile data base system** is now available for users of **NCR Corp.'s Imos 3 and Imos 5 operating systems.** The product had been available for users of **NCR's IRIX, ITX and RM/COS systems.**

Fastfile allows users to set up information storage and retrieval systems in minutes. The product uses precompiled code to allow the user to set up a customer filing system by responding to menu prompts.

From a central menu, Fastfile allows users to create up to 32 data bases, which look like standard Cobol applications, a spokesman said. Data retrieval is carried out by a customized version of the firm's Enquiry English-language report writer.

According to the vendor, Fastfile is priced at \$1,995 on all NCR I series computers. Prior to Sept. 30, the product is priced at \$1,495. Enquiry is included with the system.

Datamate, Suite 128, 4135 S. 100th East Ave., Tulsa, Okla. 74146.

■ **An integrated forms facility, support for Digital Equipment Corp. VAX clusters and a tools library** have been added to **Version 4.0 of Software House, Inc.'s System 1032 data base management system.**

The System 1032 forms facility reportedly simplifies data input and display. Automatic layout produces forms directly from data set definitions. Fields and prompts are aligned in vertical columns, and centered headers and boxes indicate data groups.

An automatic applications generator reportedly develops prototype screen-based applications using the system's fourth-generation language.

The 1032 Vaxcluster software selects between the VAX/VMS Distributed Lock Manager and an internal lock management module, the vendor said. A tools library includes data base utilities as well as Help facilities.

System 1032 Version 4.0 is priced from \$8,000 for the DEC Microvax I to \$60,000 for the VAX 8600.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

■ **Sir, Inc.** has added a **graphics component to the Digital Equipment Corp. VAX version of its Sir/DBMS relational data base management system.**

The graphics component, Graph, allows users to create business charts and graphs and create subsets of a larger data base on a table file. With Sir's SQL+ query language, users are able to manipulate and format data, generate histograms, bar charts and pie charts, as well as graphs and store the data for later use, the vendor said.

Graph is compatible with more than 70 graphics devices and can use any charting capabilities provided by the user's hardware.

Reportedly, Sir/DBMS is available on a variety of hardware and operating systems ranging from AT&T Unix-based supermicros to mainframes.

Prices for Sir/DBMS range from \$10,000 to \$75,000, depending on the hardware that is used, Sir said.

Sir, 5215 Old Orchard Road, Skokie, Ill. 60077.

■ **Boole & Babbage, Inc.** has announced **Dasd Response Manager**, an on-line tool for direct-access storage device subsystem analysis with I/O service-measuring capability. The product is available for **IBM MVS/370 and MVS/XA environments.**

Dasd Response Manager supplies management and technical users with information to control and improve Dasd response time, tune the Dasd subsystem, determine the best use of added Dasd and evaluate the impact of configuration and work load changes on response time.

At the system level, users can view Dasd service time and individual service time components. When contention is resolved, system summary reports verify the improved service. Node and path reports can be

Continued on page 63

Future Software releases spreadsheet for IBM CPUs

SALT LAKE CITY — Future Software, Inc. has announced **Future-Calc**, a spreadsheet application for multiuser IBM mainframe environments. The product is a component of the company's Future-System fourth-generation language and application development system.

Reportedly, Future-Calc allows spreadsheet models to be run in seconds and permits users to access existing files and data bases interactively and move data. The product includes capabilities for systemwide sharing of spreadsheet models.

The product features modularity,

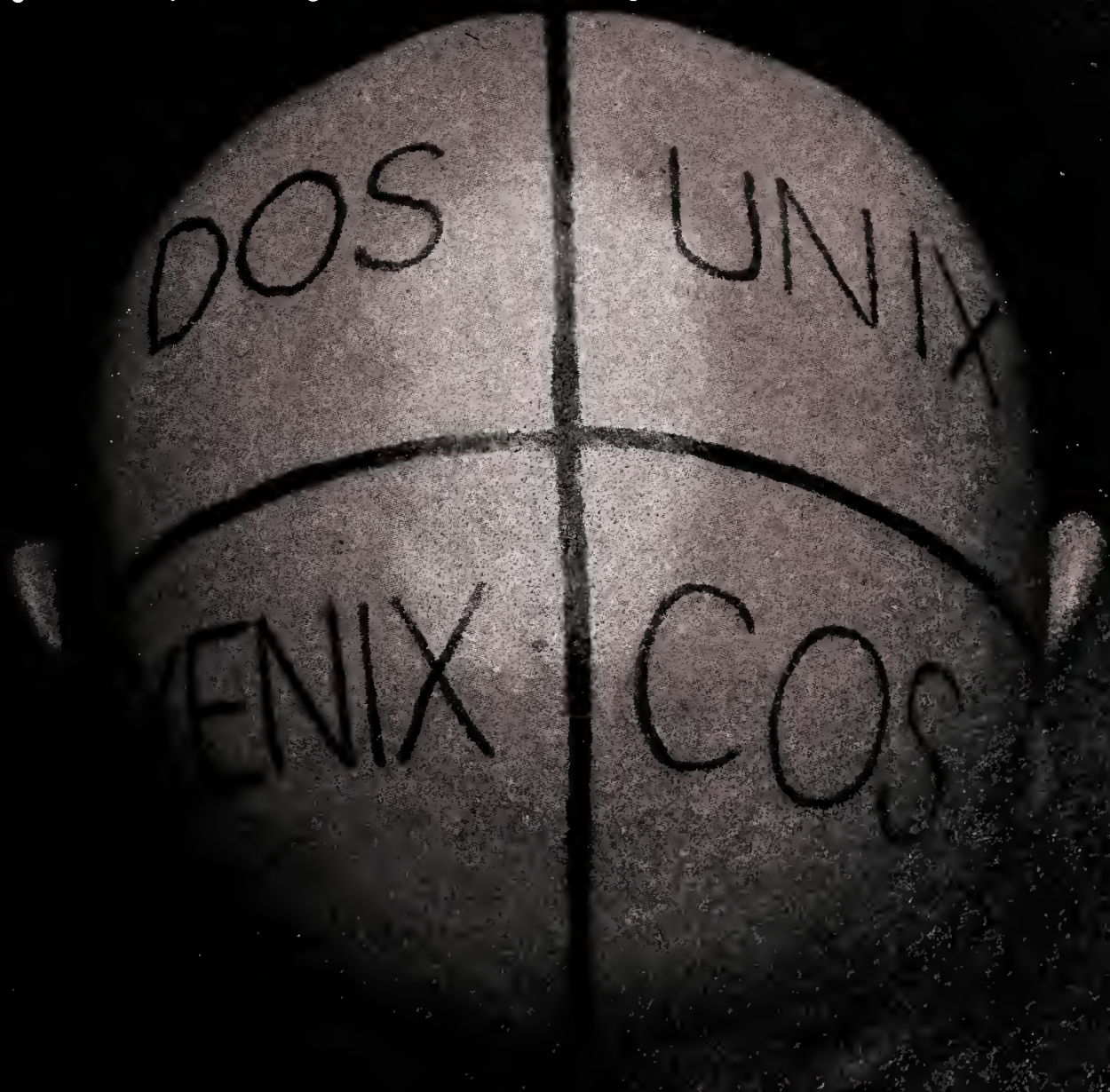
which allows any spreadsheet to be used simultaneously in any spreadsheet model by any number of users. Future-Calc spreadsheets can be attached or removed at any time.

Future-Calc runs on IBM mainframes under CICS and TSO. Spreadsheets created under TSO can be run under CICS and vice versa.

The DOS/CICS version of Future-Calc costs \$12,000. The OS1/MVS/CICS and TSO versions are each priced at \$15,000.

Future Software is located in Suite 9, 2525 S. Main St., Salt Lake City, Utah 84115.

Learn this integrated office program on one system, and you'll already know three more.



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Write for information to R Systems, Inc., 31450 Pagenrill Road, Dallas, Texas. Or phone toll-free (800) 527-7610. In Texas, call collect (214) 343-9188.

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Management Scheduling System

Command ==>

Project Title: Schedule for Well No. 121-005

Start Date (ddmmyy): 01jul85

Holidays (ddmmyy): 04jul85

Activity	Duration	Tail	Head	Target
1 Drill Well	4	1	2	
2 Build Pump House	3	2	5	
3 Install Pipe	2	5	7	10jul85
4 Construct Power Line	3	1	5	07jul85
5 Excavate	3	1	4	09jul85
6 Install Pump	6	4	7	
7 Deliver Material	2	1	3	
8 Assemble Tank	4	3	6	
9 Erect Tower	6	6	7	
10 Pour Foundation	4			
11				
12				
13				
14				
15				

Schedule for Well No. 121-005

JOB	ACTIVITY	JUL 01	JUL 04	JUL 07	JUL 10	JUL 13	JUL 16
1	DRILL WELL						
2	CONSTRUCT POWER LINE						
3	EXCAVATE						
4	DELIVER MATERIAL						
5	ASSEMBLE TANK						
6	BUILD PUMP HOUSE						
7	INSTALL PUMP						
8	POUR FOUNDATION						
9	INSTALL PIPE						
10	ERECT TOWER						

LEGEND:

- DURATION OF A NORMAL JOB
- SLACK TIME FOR A NORMAL JOB
- DURATION OF A CRITICAL JOB
- BREAK DUE TO HOLIDAY
- TARGET



SYSTEM

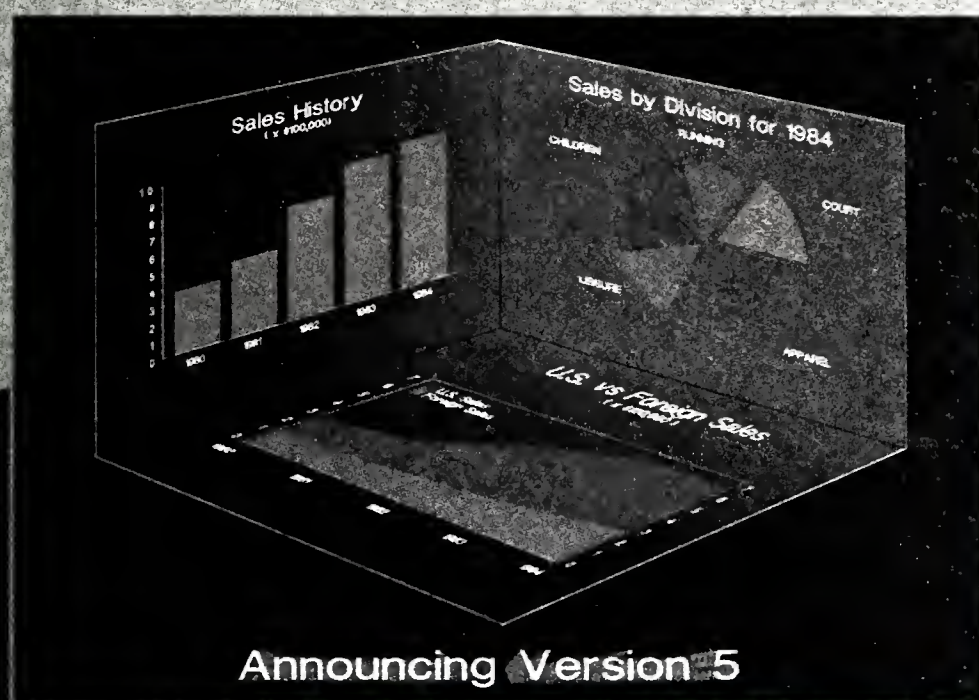
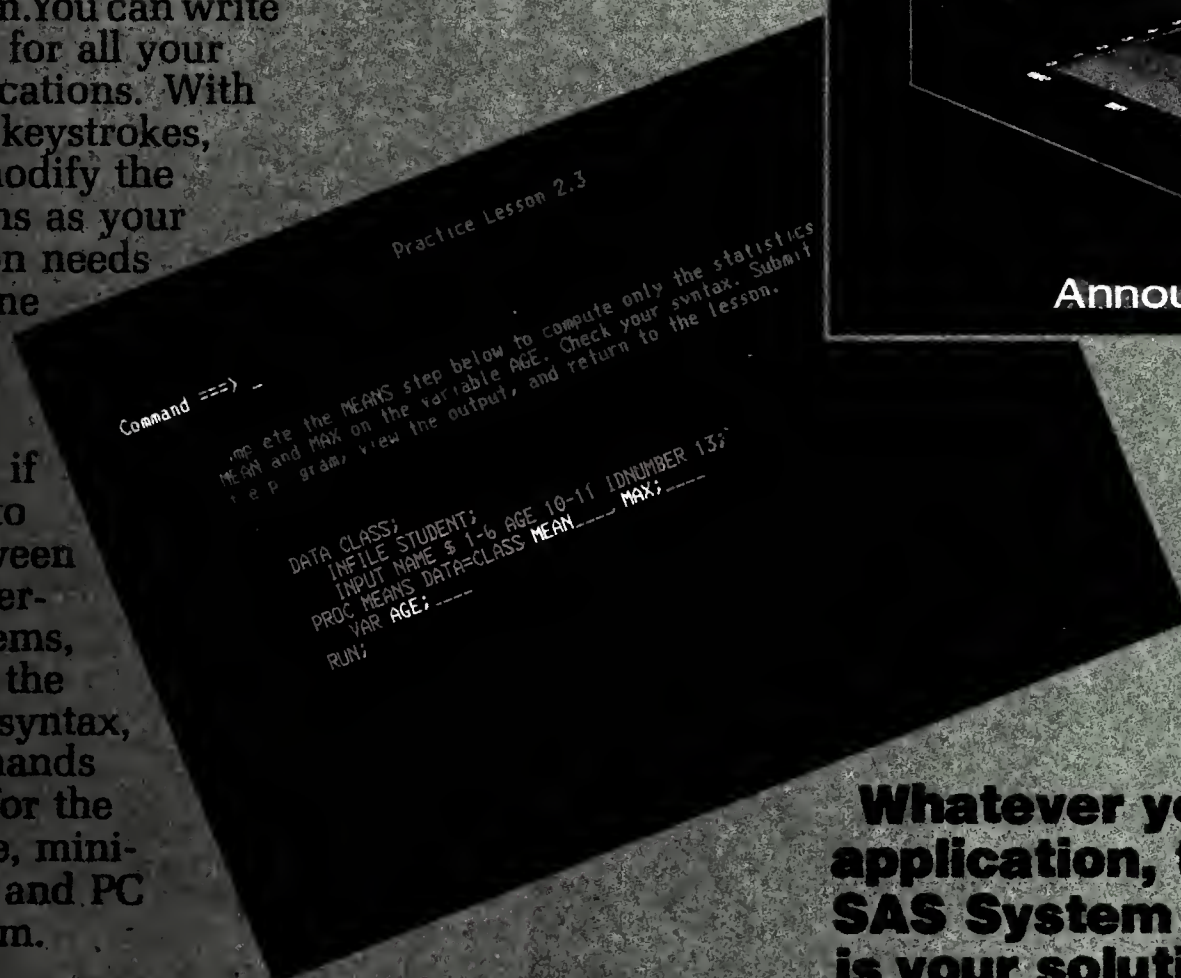
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SOFTWARE & SERVICES

Continued from page 59

generated at any point in the Dasd subsystem, the vendor said.

Prices for Dasd Response Manager start at \$11,000 for MVS/370 and \$16,500 for MVS/XA systems.

Boole & Babbage, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

■ **Mt Xinu** has announced that its **Network File System (NFS)** is now available for **Digital Equipment Corp. VAX superminicomputers running systems software based on the University of California at Berkeley's Unix 4.2 operating system.**

The NFS allows transparent sharing of files, peripheral resources and utilities. It was developed by Sun Microsystems, Inc. and has been licensed by Mt Xinu for marketing.

NFS increases the capabilities of networks by creating a distributed file system, a spokesman said. To access files with standard Unix networking tools, a user must know where the file is located on the network. With NFS, the collection of public files on various systems appears as one local file.

NFS is machine and operating system independent.

Mt Xinu provides NFS for VAXs either as an addition to its More/BSD Berkeley Unix 4.2-based binary system software or as a set of linkable binary modules for sites running Berkeley 4.2 source code.

NSF as an add-on for the DEC VAX-11/750 costs \$4,000.

Mt Xinu, Suite 120, 2910 Seventh St., Berkeley, Calif. 94710.

PRODUCTIVITY AIDS

■ **Henco Software, Inc.** has announced the availability of its **Info fourth-generation applications development software for the recently announced Digital Equipment Corp. Microvax II processor.**

Info incorporates data entry, data updating, document retrieval and text management, a query facility and a report writing system with computation capabilities.

Info on the Microvax II costs \$8,600.

Henco Software, 100 Fifth Ave., Waltham, Mass. 02154.

■ **Systems & Software, Inc.** has announced **XPC-86** for development of software that runs on **IBM Personal Computers and compatibles. XPC-86 operates on Digital Equipment Corp. VAX machines running VMS or DEC's version of AT&T's Unix operating system.**

The program also operates on any Motorola, Inc. 68000-based processor running Unix.

According to a spokesman, the XPC-86 cross-development package includes an optimized C-86 cross-compiler that supports a range of memory models, a runtime library for Microsoft, Corp.'s MS-DOS environment, an Intel Corp. ASM-86/87/186-compatible macro assembler with Intel 8087 numerical coprocessor support, a library manager and a linker that produces executable files in an MS-DOS-compatible format.

The XPC-86 package also includes a communications software module that allows Ascii and binary files to be transferred between the personal

computer and its host. The communications package provides DEC VT100 terminal emulation.

Available immediately, the XPC-86 is priced at \$9,950 for the DEC VAX and \$6,750 for the Motorola 68000-based machines running Unix.

Systems & Software, Suite C-11, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

APPLICATION PACKAGES

■ **Logicraft, Inc.** has announced an enhancement to its **Cardware software that allows graphics generated on an IBM Personal Computer to be displayed on Digital Equipment Corp. VT240 or Tektronix, Inc. 4010 terminals linked to DEC minis.**

The Cardware graphics display package runs on DEC minis equipped with the Cardware board. The board converts IBM PC-DOS programs into a format compatible with the DEC VMS operating system.

The package is said to support both the 320- by 200-pixel and 640- by 200-pixel graphics modes used by Personal Computer applications programs.

The package costs \$200 for an individual user license and \$1,500 for a site license.

Logicraft, 3 Graham Drive, Nashua, N.H. 03060.

■ **Rochkind Software Corp.** has announced **AT&T Unix versions of its Ride programming language for Digital Equipment Corp.'s VAX line, AT&T's 3B2 supermicros and Unix**

Personal Computer and Tandy Corp.'s Model 16 and TRS-6000.

Ride also runs under Microsoft Corp.'s MS-DOS. Ride features data processing functions and data base features, a spokesman said.

Ride for the VAX-11/780 runs under the University of California at Berkeley's Unix 4.2 and costs \$1,495. The product runs under AT&T's Unix System V for AT&T's Unix Personal Computer and 3B2. Ride for Tandy's Model 16 and TRS-6000 computer runs under Microsoft's Xenix. Unix versions of Ride for Tandy and AT&T microcomputers sell for \$495.

Rochkind Software, 3080 Valmont Road, Boulder, Colo. 80301.

■ **Sperry Corp.** has announced the **Municipal Financial System (MFS),**

Continued on page 64

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ARAMCO

SOFTWARE & SERVICES

Continued from page 63

based on the Sperry Mapper applications development system, for Sperry System 11 processors.

The menu-driven MFS was developed by Adirondack System Associates in Saratoga Springs, N.Y. Designed for small- to medium-size governments, MFS consists of Municipal Accounting, Municipal Payroll and Municipal Fixed Assets integrated applications packages.

According to a spokesman, the Municipal Accounting package controls and records the processing of purchase orders, invoices, cash receipts and miscellaneous transactions.

The Municipal Payroll package provides for multiple payroll cycles, multiple funds and fiscal periods, exempt and nonexempt employees and calculating payroll from gross to net with labor distribution.

The Municipal Fixed Assets package accounts for all capital assets and will accommodate multiple accounts and multiple funds.

Separately, the accounting package is priced at \$46,250, the payroll package at \$15,000 and fixed assets at \$11,000. Together, the packages are priced at \$58,500.

Sperry Information Systems Group, P.O. Box 500, Blue Bell, Pa. 19424.

■ **Marc Software International, Inc.** has announced **Wordmarc Author** and **Wordmarc Composer** word processing programs for minicomputers.

Both programs are new versions of the company's Wordmark word processing program introduced in 1981. The programs operate on minicom-

puters from Digital Equipment Corp., NCR Corp., Hewlett-Packard Co., AT&T, Harris Corp., Prime Computer, Inc. and Apollo Computer, Inc. The programs are also available for microcomputers running Microsoft Corp.'s MS-DOS operating system.

Wordmarc Author is for users concerned with the content of letters. Wordmarc Composer is for users editing complex documents.

Both products are scheduled for September availability. Prices range from \$495 for the micro version to \$8,900 for the DEC VAX 8600 series.

Marc Software, No. 200, 260 Sheridan Ave., Palo Alto, Calif. 94306.

■ **Environmental Systems Research Institute (Esri)** has announced **Network**, an additional component in the company's **ARC/Info geo-**

graphic information system, which runs on Prime Computer, Inc. and Digital Equipment Corp. processors.

Network is used to manage geographic networks like city streets, railroads, rivers and utility lines. The program allows users to create, analyze and display the time, space and impedance relationships common to geographic design. Analysis tools include optimum routing, address matching, facility allocation and intersection districting.

Functions that Network performs include parcel address matching, coding of street addresses to street segments and polygons, calculation of address coordinates and selection of optimum path routes.

Network is priced at \$15,000, including one year of maintenance.

Esri, 380 New York St., Redlands, Calif. 92373.

■ **Digital Equipment Corp.** has announced that **Interleaf, Inc.**'s composite document processing software is available on DEC's Vaxstation I and Vaxstation II processors under the MicroVMS operating system.

The Interleaf Workstation Publishing software enables users to prepare and edit documents containing multiple proportionally spaced typefaces, graphics and data-driven business charts.

A mouse or menu-driven interface allows users to access editing and formatting routines needed to produce typeset-quality originals, a spokesman said.

Interleaf Workstation Publishing software will be available this summer through Digital's Classified Software program. It is priced at \$3,000.

DEC, 146 Main St., Maynard, Mass. 01754.

■ **Network Solutions, Inc.** has announced **Maintenance/1**, an on-line maintenance system and parts inventory control for fleet vehicles. The product runs on IBM System/36 minicomputers.

A spokesman said the package can accommodate preventive maintenance scheduling, provide status reports and update repair orders and parts inventory. It can also track costs associated with the ownership of the vehicle. Maintenance/1 consists of six modules, which can be purchased separately or as a package.

The product costs \$30,000. Network Solutions, 401 Jefferson Blvd., Warwick, R.I. 02886.

DATA BASE MANAGEMENT SYSTEMS

■ **BTI Computer Systems, Inc.** has introduced a relational data base management system and fourth-generation applications development language for its BTI 8000 32-bit multiprocessor system.

The Multiple Access Retrieval System II (Mars II) DBMS includes an ad hoc query facility, a user-directed screen formatter and data dictionary. Mars II costs \$25,000.

BTI Computer Systems, 870 W. Maude Ave., Sunnyvale, Calif. 94086. See DBMS page 66

"In one day, we'll show you how to manage your company's information needs for years to come."

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Author, Lecturer and
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A one-day consultation with James Martin Associates can offset years of information programs. It can help your people develop the information they need. So they can make important decisions correctly. It can be the first step toward improving response time, making data bases flexible and integrating personal computers.

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We have learned that information management is essentially an engineering problem. The proper methodology and framework ensure a system that works for all who depend upon information. For this reason, we carefully examine the requirements of everyone from top management to mid-level supervisors to programmers. We then place powerful, easy-to-use software tools in the hands of those who need to transform data into useful information.

And, most significantly, you don't have to wait. Instead of platforms and proposals, we give you tools that are available . . . now.

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bases for optimal efficiency so that you derive maximum potential from your current technology.

In fact, our whole approach makes the most of the systems you currently have. You don't have to start from scratch.

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Information Engineering involves clear-headed logistics so that information moves precisely where it should. Rather than having rooms of programmers, writing in cumbersome languages like COBOL or Fortran, you can have end-users creating their own applications with new fourth-generation software tools. Your hardware assumes the burdensome task of generating code. And your users obtain information in a fraction of the previous time.

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Information Engineering can revolutionize the way your company processes and distributes information. We'll demonstrate this approach to you at a one-day seminar, conducted at your location for up to fifty people. If you decide to proceed with a consulting agreement, there is no cost or obligation. Just an opportunity to learn from our experts.

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security software cuts out any shenanigans with your company's data. By anybody. From phone-phreaking hackers to hard-nosed computer crooks.

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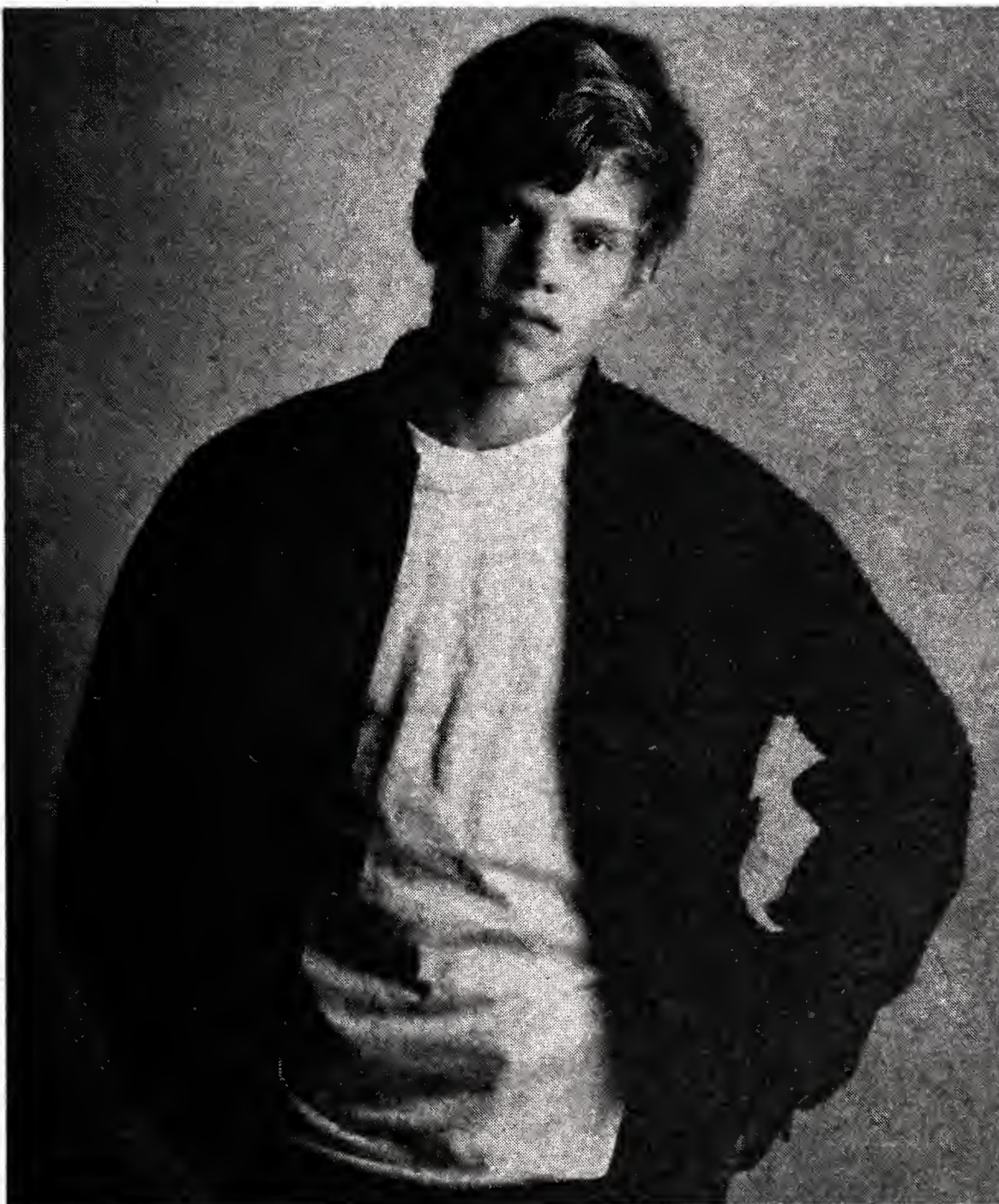
The Department of Defense has awarded TOP SECRET a C-2 classification, the highest rating the government has given to any MVS data security software product.

TOP SECRET software utilizes the standard MVS security interfaces. So security implementation is easy, painless and practically undetectable to end-users.

With no disruption to normal work routines, TOP SECRET lets you secure critical resources immediately, define others, and then proceed in stages to full data protection. You control security at your own pace with TOP SECRET software's unique phased implementation.

Because TOP SECRET is so flexible, you don't ever have to worry about future compatibility as your systems grow and change. And TOP SECRET makes sure you can protect a full range of MVS software products right now.

Installation Time: less than half an hour, with no IPL and no modifications to the operating system because TOP SECRET uses standard



MVS security interfaces. So, when MVS changes, you don't have to.

Administration: convenient, total security administration across all subsystems from any terminal. And with immediate results.

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TOP SECRET VM will be available October, 1985.

SOFTWARE & SERVICES

DBMS from page 64

■ **Sir, Inc. has announced that its Sir/DBMS relational data base management system is now available for Sun Microsystems, Inc.'s AT&T Unix-based technical workstations.**

The window management facilities of Sun workstations allow users to run several programs concurrently, according to a spokesman. Reports and tables from the data base reportedly can be cut from one window and pasted directly onto another window on the same screen.

Sir/DBMS uses the SQL+ nonprocedural query language, the company's version of IBM's Structured Query Language. It reportedly also offers a procedural language for data retrieval, analysis and application development. Other components of Sir/DBMS include Forms, a screen-oriented data entry and retrieval system; Host, a language interface; Help, an on-line user assistance facility; and Graph, an interactive system for high-resolution business and statistical graphics.

Sir/DBMS for Sun Microsystems workstations costs \$10,000 for up to four Sun nodes and \$1,250 for each additional node up to 20. Site licensing is available for users with over 20 nodes.

Sir, 5215 Old Orchard Road, Skokie, Ill.

■ **Honeywell, Inc. has introduced a relational data base management system for its DPS 8, DPS 88 and**

DPS 90 computer systems running the Gcos 8 operating system.

Magna 8, developed by Magna Business Systems, incorporates a relational join technique that allows users to access up to 20 data sets simultaneously, a spokesman said. An integrated data dictionary defines and documents new information.

The Magna 8 uses near-English commands for developing and maintaining applications, accessing and modifying the data base and preparing reports.

Magna 8, scheduled for fourth-quarter availability, costs \$120,000.

Honeywell, P.O. Box 8000/A-79, Phoenix, Ariz. 85066.

■ **Micro Data Base System, Inc. has announced that its Knowledgeman relational data base management system and report generator is now available on Digital Equipment Corp.'s VAX-11 systems running the Ultrix operating system.**

Knowledgeman was previously available under IBM's PC-DOS, Microsoft Corp.'s MS-DOS and Digital Research Inc.'s CP/M 86 operating systems.

Besides the DBMS, Knowledgeman includes text processing and statistics, report generation and forms management functions. Security includes data encryption, user passwords and read/write access codes.

Knowledgeman for the DEC VAX-11 costs \$24,000.

Micro Data Base Systems, Suite 400, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

SQL from page 57

rection." The other primary determinant in users' selection was the low cost of SQL. Software AG's Adabas, Applied Data Research, Inc.'s Datacom/DB, Information Builders, Inc.'s Focus, Martin Marietta Data Systems' Ramis and IBM's Query-By-Example were listed as the products most often considered before SQL.

Despite the fact that SQL is touted as an end-user-oriented product, Xephon said, only a handful of respondents said they ran the product on a separate information center machine. "Although some believe it is wiser to run information center systems on a separate machine and not let them interfere with production," the study stated, "all but three respondents specified that SQL ran on a shared machine at their sites."

Respondents said they used SQL most often for ad hoc queries and reporting and simple applications. Not surprisingly, Xephon said, it is not used often for transaction processing. Users said large, complex or high-volume applications presented problems for SQL.

Xephon found applications programmers were the largest group of SQL users, followed by professional staff and "clerical task workers." Those using SQL least were senior management and DP staff other than applications programmers. "Only applications programmers in practice seem to be making significant use of the product," the study said.

"To offer SQL to real end users," it stated, "an installation must provide

a framework such as QMF [IBM's Query Management Facility] or [Artificial Intelligence Corp.'s] Intellect to allow the user to concentrate on turning data into information without being bogged down by the internals of running the query and handling the output. The user [also] needs a simple way of saving queries or reports for later use. The user should only specify *what*, not *how*."

Although there was no consensus on what users saw as SQL's most troublesome feature, several users cited the lack of a facility for job accounting and difficulties with table joins as problem areas. Twenty-one users said data base locking was a problem.

Highest rated benefits

The highest rated benefits of SQL were its reliability, value for the price, IBM's support and ease of installation. Most respondents said they were happy with SQL, and only six users said they were considering switching to another product.

"With most respondents," the study stated, "the main benefit is that they can develop systems much faster, the investment is smaller to begin with, and the returns start accruing much sooner. Even if the same application would eventually run more efficiently under a more traditional system, it might never catch up, economically speaking, with the SQL version."

The study, "SQL in Practice," is available for \$45 from Xephon, c/o WPWS, P.O. Box 1704, Winter Park, Fla. 32790.

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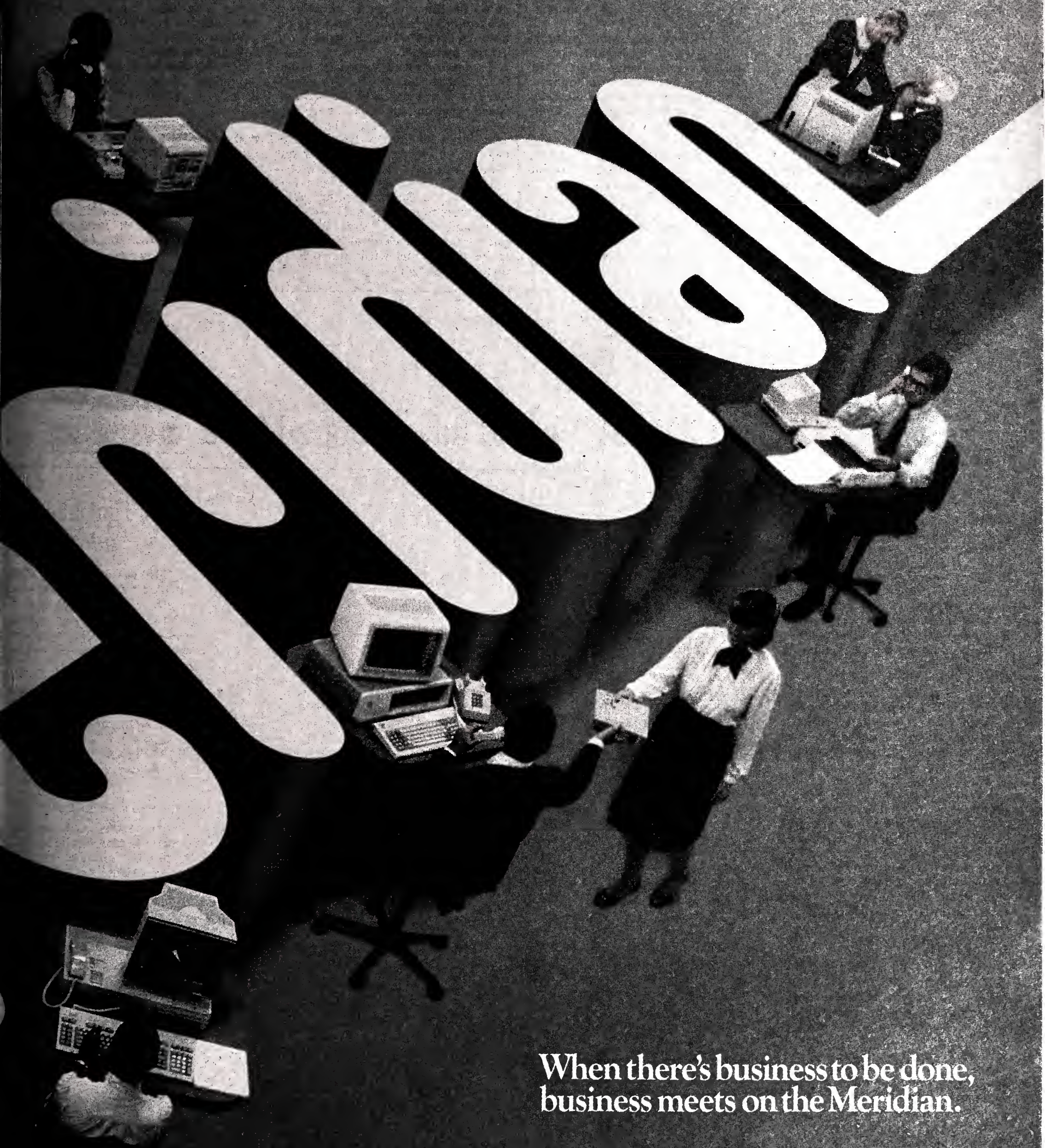
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SOFTWARE & SERVICES

SOFTLINE from page 57

have emerged.

The latest languages can be described as applications-programmer-friendly. These languages are not as procedural as the generation 3.5 languages and can be considered professional-friendly. Microcomputer versions of these languages provide almost the same functions as their respective mainframe versions.

Generation 3.9 languages are non-professional-friendly and are used to build expert systems. Each statement consists of a condition and an action. If more than one condition is true, then the consequences are executed in either parallel or random order.

For the past few years, people have spoken of these post-third-generation languages as fourth-generation languages. But before a language can be considered fourth generational, it should contain the following nine features:

- **Applications generators.** Applications generators currently exist in the form of structured, data base-oriented, inquiry/update transaction processing applications programs. They will probably continue to exist but will give way, in part, to the information generators.

- **Information generators.** The information generators will support less structured, user-defined information requirements, dynamic data access paths and reporting formats.

- **Prototype construction.** Prototypes are working models of systems that can be changed quickly and easily. A successful prototype gives a view of the system that allows end users to visualize what they will be getting; it also must be only a working model so that it can be easily changed to accommodate end-user requests.

- **Screen mapper.** This feature designates the positions of the screen for fields, text and other elements. While all fourth-generation languages may not have this feature, it will be an integral part of most of them.

- **Specifications generator.** A specifications generator will represent specifications in a formal way and replace the traditional writing of specifications in English. Specifications are generally imprecise and require a great deal of human interpretation by the applications programmer when creating the code.

- **Nonprocedural DBMS language.** A procedural language requires programmers to follow a rigid series of steps to perform an operation. The same result could be achieved by performing the steps in any sequence using a nonprocedural language. A forgiving nonprocedural language permits a great deal of flexibility in performing the steps and is user-friendly. The nonprocedural language can be used in conjunction with a DBMS to perform data entry, storage, maintenance, selection, retrieval and data analysis.

- **Report generator.** The generation of reports is always going to be an integral part of any fourth-generation language. The report generator can retrieve data from either conventional files or from data bases under the control of DBMS and can create reports in various forms. The report generator may or may not have updating capabilities.

- **Decision-support languages.** A decision-support system consisting

of a business model and a data base model must be included in a fourth-generation language.

- **Query language.** The major priority of a query language should be fast response.

A true fourth-generation language should also be transparent to the operating system, menu-driven with a prompting system, user friendly, controllable through a data dictionary, supported through at least one DBMS and a usable tool for third-generation language programmers.

With those criteria clearly in mind, will the real fourth-generation languages please stand up?

Atre is president of Rye, N.Y.-based Atre International Consultants, Inc., and a regular contributor to Softline.

LANGUAGES

■ **Foothill Research, Inc. has announced that its Style high-level programming language is now available for AT&T's Unix System V operating systems.**

Style is intended to replace Cobol for business and financial applications development, although Style-based programs can coexist with current Cobol applications, a spokesman said. Style includes a data management system for business, and financial applications development is also available for Digital Equipment Corp.'s VAX series running VMS; Stratus Computer, Inc.'s FT-200, XA-400 and XA-600 superminicomputers; and Data General Corp.'s MV series superminis with the AOS/VS operating system.

Style can access Cobol programs, files and previously collected data. The features reportedly allow users to continue to use their Cobol programs and data while developing new applications with Style.

Style costs from \$17,500 to \$45,000, depending on the system.

Foothill Research, Suite 300, 1301 Shoreway Road, Belmont, Calif. 94002.

■ **Hewlett-Packard Co. has introduced Fortran 77 for the HP 3000 system.**

HP Fortran 77/3000 is based on the Ansi Fortran 77 language standard and is compatible with Fortran 77 on HP 9000 and HP 1000 computers. According to a spokesman, the language includes generalized I/O statements, an Include statement

COMPAQ could have stopped here



SOFTWARE & SERVICES

that allows insertion of program test from another file and statements that eliminate the need for program labels and GOTO commands, the spokesman said.

HP Fortran 77/3000 is compatible with the HP 3000 Multi-Programming Executive operating system.

The product is priced at \$5,000, the vendor said.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

■ **Green Hills Software has announced two compilers, the Optimizing Fortran-32000 and Optimizing Fortran-68000, both globally optimizing compilers for Ansi standard Fortran 77.**

The products run on Digital Equipment Corp. VAX series supermini-computers as cross-compilers, Sun

Microsystems, Inc. Workstations and the National Semiconductor Corp. Sys-32.

According to a spokesman, the compilers implement mainframe compiler optimization techniques and feature full IEEE standard floating-point support.

The SKY floating-point board is supported with in-line code for performance on Motorola, Inc. 68000 systems, according to Green Hills Software.

AT&T Unix calling conventions are also supported.

Native compilers for single-user Sun Microsystems systems are available for \$2,000.

Sys-32 Genix compilers cost \$3,000, and VAX/Unix cross-compilers are available for \$6,000.

Green Hills Software, 55 N. St. John Ave., Pasadena, Calif. 91103.

TEAM from page 57

team would be to get, say, all your high jumpers together to discuss techniques to make them exceptional high jumpers. They are really individual performers, however, and they have to do their work on their own."

The dual character of the programmer's professional environment, Couger said, can sometimes spawn frustration. Large systems development requires coordination and cooperation, but a team leader walks a fine, easily crossed line between supporting a programmer's individual efforts and stymieing his creativity and productivity.

"Many managers overlook a key factor that interferes with a team's successful operation," Couger said. "That is the very low tolerance for

team activities on the part of programmers and analysts. They are willing to participate in group activities and meetings to do something they cannot do alone, to accomplish a goal. But our studies have shown that programmers don't need the social interaction other workers derive from meetings. They would rather be off at their desks doing analysis, design and programming."

Failure to prepare leaders

Couger said he is amazed at how little formal training most team leaders receive before being sent to the development front, so to speak. He said colleges, other than his own, also get poor marks for failing to prepare students to participate in or lead programming teams. The ill-prepared team leader faces a hostile audience.

"If the team leader cannot control the meeting or has not organized it properly, programmers can become very impatient," he said. "They show very little tolerance for poor leadership. That is why so many programming teams fail to meet their objectives."

Couger warned against the assumption that programmers don't appreciate the importance of the team approach to systems building. On the contrary, he said, programmers are eager to discuss group concerns, to learn new techniques and to have their work critiqued by their peers. But their self-motivation, the very characteristic that makes them valuable employees, is chilled in a poorly run team.

"The programmer sees the need for a team and coordination," Couger said. "But he thinks back to teams he was involved with that were inefficiently run, and he comes to the conclusion that, overall, teams are not very effective. His feelings are more about the way teams are run than about their purpose. The programmer has a drive to be in control of his destiny, and when he is involved with a poorly run team he becomes very frustrated."

Team tonic — training

The tonic for the teams, Couger said, is better training of leaders. Also, he said, companies should avoid a management structure that requires a team leader to report to more than one manager.

"The matrix organization, where a leader must negotiate and interact with middle managers, makes it difficult for a team leader, only a newcomer to management, to succeed," he said. When nurtured by just one upper manager, the team leader learns more quickly and coordinates team efforts more efficiently.

Finally, Couger said, teams often fail because management fails to understand what motivates the individual team participants. The work itself is the programmer's primary motivation, Couger's studies indicated. But the work motivation is composed of several other motivators.

Couger uses the following terms to describe them: autonomy, the freedom to do the work required; task significance, the knowledge that the individual job is significant to the entire project; skill variety, being presented with a mix of tasks; task identity, the ability to relate the task at hand to the whole; and feedback on performance. Of those, Couger said, management most often fails to give programmers autonomy.

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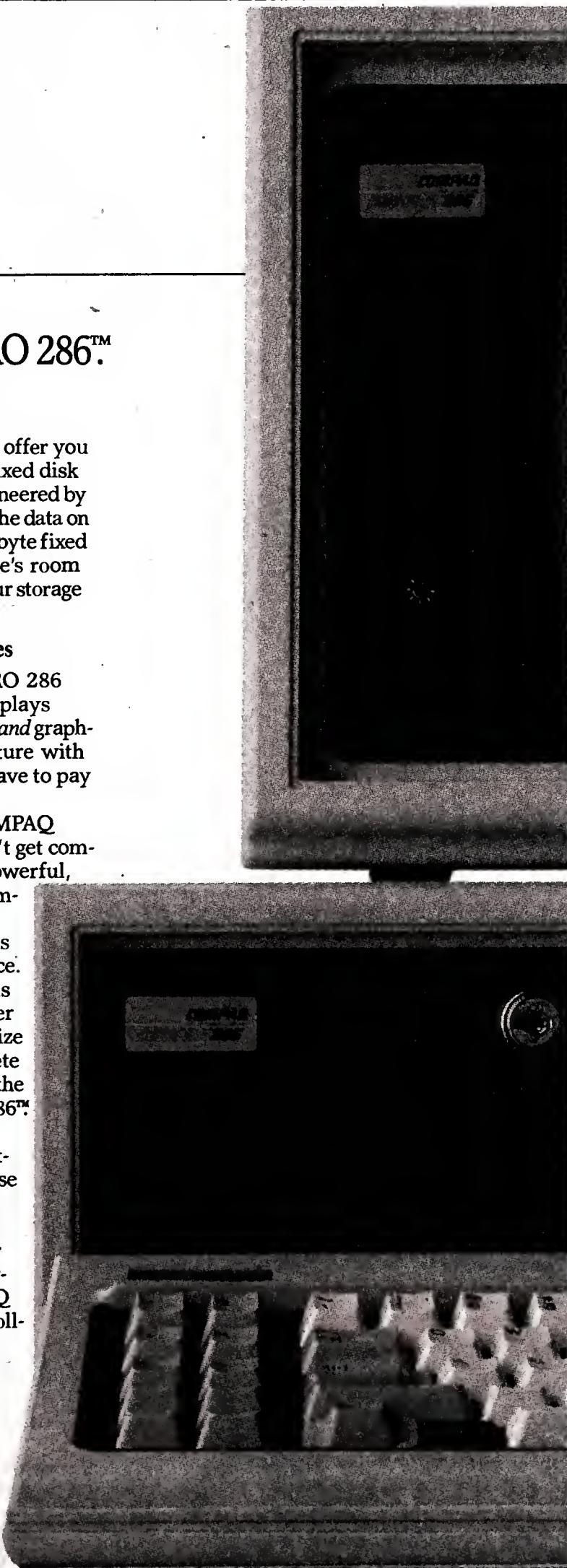
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S-100 Modem	349
Password	325

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310A	Call
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600 Ctr HR	455
NEC	
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JC1216 RGB	429
PGS	
HX12 RGB Color	\$475
MAX 12E	179
Quadram	
Quadchrome	\$489
Quadchrome II	429
Amberchrome	175
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Sanyo	
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Taxan	
Model 420L RGB	\$499
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Zenith	Call

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Taxan	
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Persyst	
BoB Bd for 440	\$475

DISK DRIVES

CDC 1800	\$159
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I-Omega	
Bernoulli Box	Call
Maynard HD	Call
Maynard Electronics	
Maynstream: Portable back-up for HD System 60 (incl 1 cntrlr card)	\$1695
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Cartridge 450'	ea 35
Cartridge 600'	ea 45
Mountain, Inc.	
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For more info	Call

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Tallgrass	Call
(Wisconsin customers)	
Tandon TM-100-2	Call
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3M 5 1/4" DS, DD (Box/10)	\$ 30
Maxell	
MD2-HD (diskettes for IBM-PC-AT, Box/10)	\$ 69
Ultramagnetics	
5 1/4" DS, DD (Box/10)	\$ 25
Verbatim	
5 1/4" DS, DD (Box/10)	\$ 30

DISPLAY CARDS

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Paradise	
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Tecmar	
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MICROCOMPUTERS

Tandy reduces 1000 cost, offers hard-disk version

FORT WORTH, Texas — Tandy Corp. has announced a price reduction for its Tandy 1000 personal computer, a machine said to be compatible with the IBM Personal Computer. It also introduced a hard-disk version of the machine and an external 10M-byte hard disk drive.

Under the new pricing scheme, the cost of the Tandy 1000 is reduced from \$1,199 to \$999 for the standard version, with 128K bytes of memory, one 360K-byte diskette drive, video and graphics interfaces and ports for joysticks and a light pen.

The hard-disk version of the Tandy 1000 reportedly includes those features and a 10M-byte disk. It carries a \$1,999 price tag, the same as the Tandy 1200, an IBM-compatible unit, which also has a 10M-byte internal hard disk.

Asked to explain the similarity, Ed

Juge, director of market planning for Tandy's Radio Shack Corp. subsidiary, said the two "are totally different machines." The 1200 has an IBM-style keyboard but no graphics card as standard equipment, while the 10M-byte version of the 1000 provides a keyboard like that of the Tandy 2000 personal computer and includes a graphics card.

The Tandy 1000 comes with Deskmate software, an integrated package containing WP functions, a spreadsheet, scheduler, dialer and telecommunications.

The external 10M-byte hard disk drive unit being offered requires a hard-disk controller; a Tandy hard-disk controller is priced at \$399. The hard-disk unit itself costs \$699.

Tandy is located at 1800 One Tandy Center, Fort Worth, Texas

Symphony aid announced

NEW YORK — The PC Productivity Center of the Center for Advanced Data Processing, Inc. has introduced Symplify, software that adds desktop utility features to Lotus Development Corp.'s Symphony integrated package.

Symplify, priced at \$50, is said to aid users by permitting them to access address files, a calendar and an electronic expense report form while working with Symphony. The package is retrieved as a Symphony file and is run with a command sequence familiar to Symphony users. Other features are said to include a simplified data base and report generator, both of which keep Symphony readily available for calculations. Automatic dialing is available for users with a Hayes Microcomputer Products, Inc. internal modem.

The Center for Advanced Data Processing is located in Suite 402, 450 Seventh Ave., New York, N.Y. 10123.

Wizdom XS package out

NEW YORK — Software Intelligence Laboratory, Inc. has introduced Wizdom XS, an expert system for commercial and financial applications, which runs on the IBM Personal Computer under PC-DOS 2.0 or higher.

Wizdom XS, priced at \$1,250, is said to be a generic expert system capable of acquiring knowledge bases through being programmed by users. Once the knowledge base is built, users can invoke Wizdom's inference engine to solve problems.

Suggested uses include bank teller assistance, financial investment advisement, sales and marketing support, problem diagnostics and program debugging.

The software, written in C, reportedly has no limit on the number of rules that may be included.

Software Intelligence Laboratory is located at 50 Broad St., New York, N.Y. 10004.

MICRO BITS/BRUCE J. DUNN

Implementing a micro center

Once a microcomputer center has been established as an organizational function, what is needed to implement the center?

Anything fancy, like local-area networks, programming services and specialized applications of the microcomputer (i.e. computer-aided design, voice capabilities or mainframe hookups) will not be covered here. Instead, I'll discuss three topics: the necessities, the near necessities and training. All items included are based on actual experience in operating a microcomputer center.

The necessities

The following items are necessities for a microcomputer center.

■ **Printers.** Most users will need a printer. Any attempts to share them between users will probably not work. The center should have the following printers available: letter-quality, dot matrix, near-letter-quality/dot matrix and even a laser or high-speed printer. They will all be needed at one time or another.

■ **Printer supplies and accessories.** It is amazing how easy it is to forget to order supplies of paper, forms, ribbons, sheet feeders, tractor feeds and cable at the same time the printers are ordered. Most printers do not come standard with any of these items.

■ **Sound covers.** Because most people do not work well in a noisy environment, and because most printers are noisy, sound covers are a necessity. Stand-alone sound covers are available for printers that are not placed on of-

See **CENTER** page 82

Dunn is an assistant director of data services for the city of Dallas. As the assistant director he manages the systems programming, data base, office systems, information center and microcomputer groups.

Intex Solutions's X-Y-Z software consolidates data in Lotus' 1-2-3 work sheets/74

■ Micro Focus introduced Co-Maps, software for creation of IMS/MFS and CICS/BMS mainframe maps on IBM microcomputers/74

■ Office Solutions enhanced its Officewriter software for the IBM Personal Computer/74

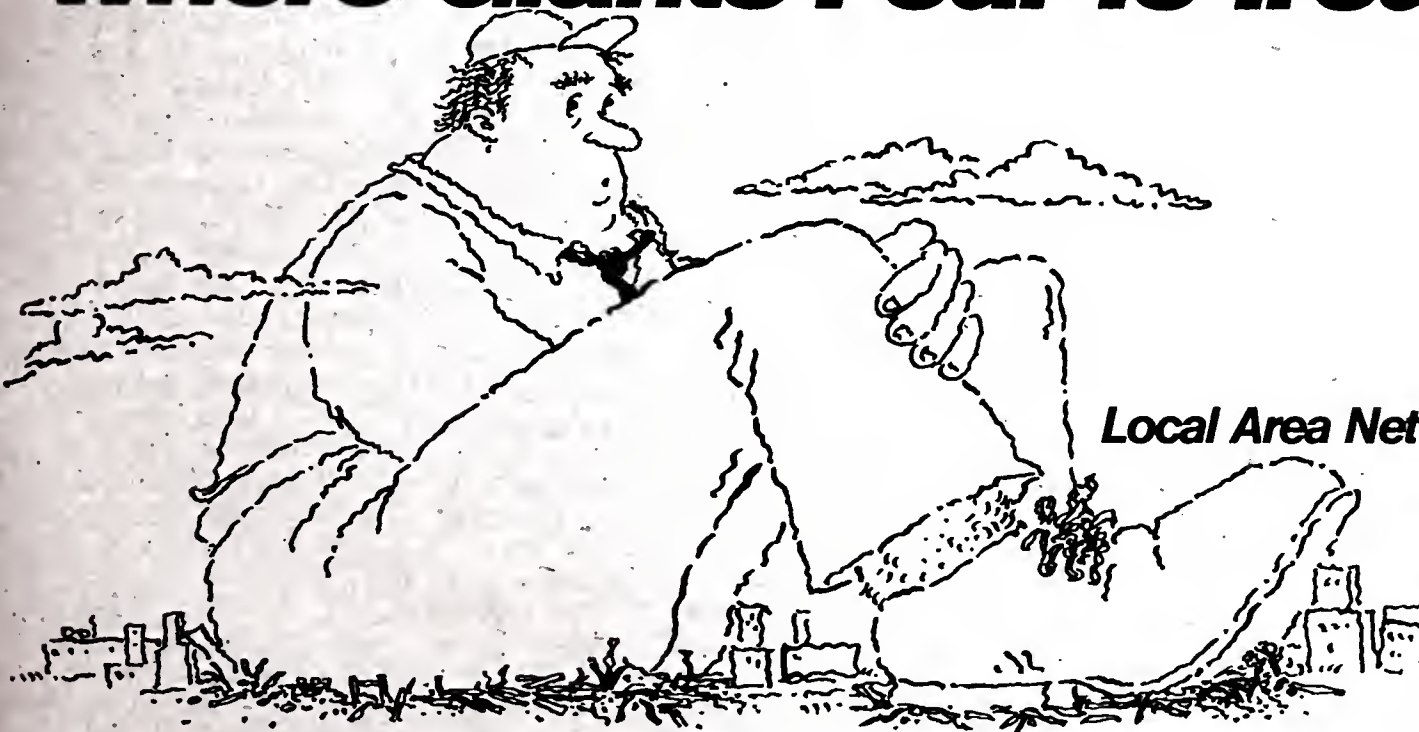
INSIDE

Software/75

Systems/80

Communications/80

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MICROCOMPUTERS

Intex unveils X-Y-Z aid for 1-2-3 consolidation

NEEDHAM HEIGHTS, Mass. — Intex Solutions, Inc. has introduced its X-Y-Z software for use in consolidating multiple data sheets produced under Lotus Development Corp.'s 1-2-3 package on the IBM Personal Computer.

X-Y-Z is said to offer the ability to move, merge or summarize any specified rows or columns of data from as many as 255 1-2-3 worksheets. It can let 1-2-3 users create multidimensional worksheets and imposes no additional command structures on the user.

It also is said to permit customized consolidation procedures, such as weighted averages, and to provide users with quick comparisons of data from separate worksheets.

It costs \$145 for a 12-worksheet version and \$395 for a 255-worksheet version.

Intex Solutions can be reached at P.O. Box 183, Needham Heights, Mass. 02194.

Office Solutions enhances tools

MADISON, Wis. — Office Solutions, Inc. has announced enhancements to its Officewriter and Officespeller software for the IBM Personal Computer.

Officewriter 3.5 is said to offer pagination within the package's editing function, which allows users to invoke a special-function menu from within the edit session with a single keystroke. Also included is automatic footnoting, which allows the user to create and edit up to 999 footnotes per document, the vendor said.

Officespeller reportedly is now able to detect typographical errors and offer the correct spelling from a list of alternatives. Based on the *Merriam-Webster Dictionary*, Officespeller contains 80,000 words and the capacity for users to add customized words. The custom dictionary can be reviewed and modified at any time using the software's custom dictionary maintenance function.

Officewriter features are said to include the ability to adjust text automatically and constantly, permitting users to see exactly what they will print on paper. Officewriter also stores boilerplate language and inserts it into documents, spools up to 10 documents for printing and lines up columns of numbers by their decimals. The product allows data from Lotus Development Corp.'s 1-2-3 to be imported into documents, according to the vendor.

Officewriter costs \$325; with Officespeller the price is \$445. Officespeller alone costs \$165.

For additional information, Office Solutions is located at 2802 Coho St., Madison, Wis. 53713.

Data switching: Equinox makes it simple.

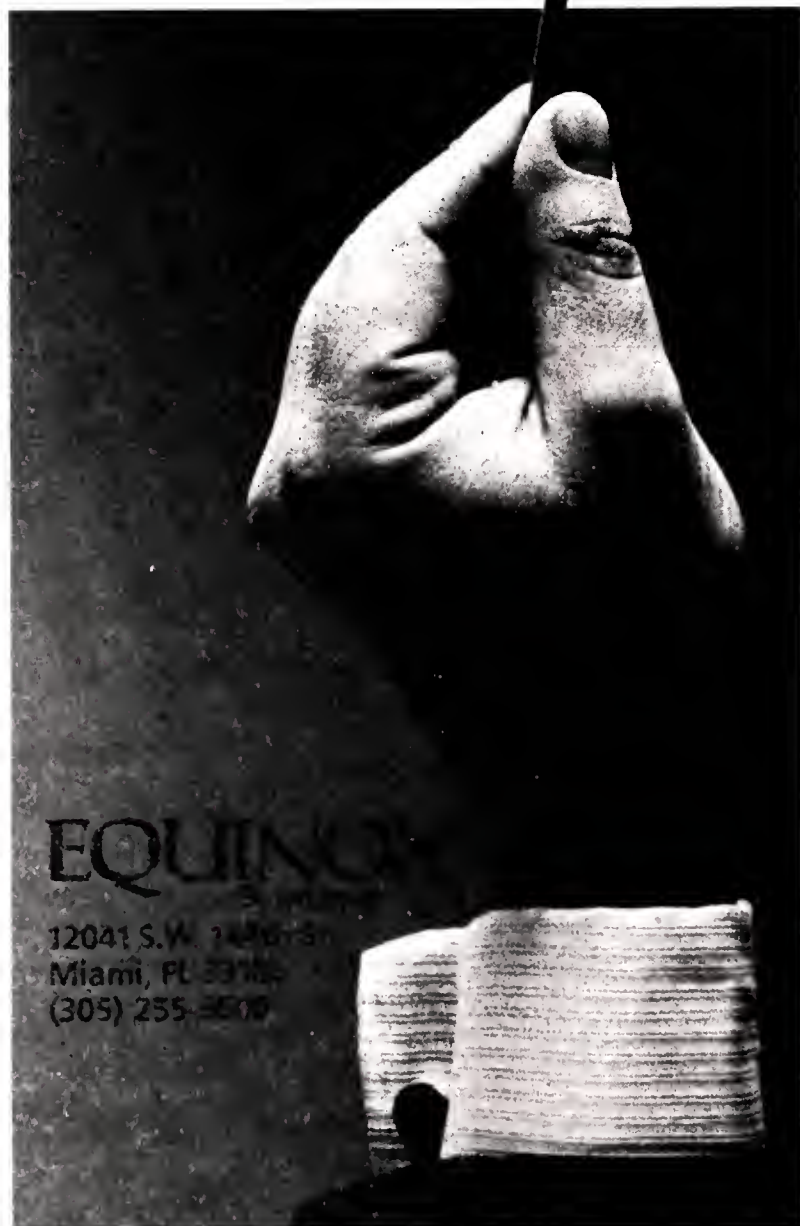
Introducing the Equinox Data PBX; a port selector that makes switching terminals between computers as simple as dialing a phone number.

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Co-Maps software out

PALO ALTO, Calif. — Micro Focus, Inc. has announced software that reportedly allows programmers to create IMS/MFS and CICS/BMS mainframe maps on IBM microcomputers.

Co-Maps is said to include a screen painter and other development tools to generate IMS/MFS and CICS/BMS macros and associated Cobol source statements on the IBM Personal Computer, Personal Computer XT and AT and 3270 Personal Computer.

Used with the vendor's VS Cobol Workbench, a mainframe Cobol applications development program for micros, Co-Maps reportedly allows micros to function as fully integrated mainframe workstations.

Co-Maps also is said to allow existing BMS macro definitions to be loaded on the micro, then modified to produce new maps and map sets. This function allows users to convert CICS applications screens to IMS quickly. The product also allows images created on Micro Focus' Forms micro-based screen painter to be converted into MFS and BMS maps.

The product's development tools are said to include single-keystroke map set, map and field definition and Help, Directory and Copy functions.

Co-Maps requires a minimum of 256K bytes of random-access memory, two 360K-byte disk drives and IBM's PC-DOS 2.0, 2.1 or 3.0.

The product costs \$500 and will be available July 1.

Micro Focus is located at 2465 E. Bayshore Road, Palo Alto, Calif. 94303.

Zilog supermicros get Macintosh access

CAMPBELL, Calif. — Zilog, Inc. has announced software that reportedly allows supermicrocomputers in the Zilog System 8000 series to serve as host processors, file servers and communications gateways for the Apple Computer, Inc. Macintosh.

The Ultra-Talk software, developed by Lutzky-Baird Associates of Culver City, Calif., is said to be the first product of the Ultra-Office series, which is based on Apple's Appletalk network.

As a central host, Ultra-Talk reportedly allows multiple Macintosh users to execute programs directly on the AT&T Unix-based System 8000.

According to the vendor, the product gives Macintosh users access to between 52M bytes and 672M bytes of mass disk storage on the System 8000. As a communications gateway, the System 8000 provides access to networks such as IBM 3270 Systems Network Architecture/Synchronous Data Link Control, 3270 Bisynch and 2750/3780, Xerox Corp. Ethernet and X.25.

The Unix-based Zilog System 8000 series is composed of the Model 12, Model 22 and Model 32. The Model 12 is said to support up to 16 users and the Model 22 and Model 32 up to 40 users.

Ultra-Talk costs \$2,000 per Unix supermicro and \$300 per Macintosh.

Zilog is located at 1315 Dell Ave., Campbell, Calif. 95008.

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Denver	Jul 18, Aug 13
Detroit	Jun 25, Jul 23
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MICROCOMPUTERS

SOFTWARE

■ **Logicraft, Inc.** has introduced a graphics software package for use with its Cardware software, a product that reportedly permits all Digital Equipment Corp. minicomputers to run IBM Personal Computer applications.

The graphics package reportedly enables DEC VT240 and Tektronix, Inc. 4010 graphics terminals to display Personal Computer programs running on DEC minis. The package consists of a software-installable driver that converts the bit-mapped image for the Personal Computer into Tektronix command sequences.

The package costs \$1,500 for a site license and \$200 for individual users.

Logicraft, 3 Graham Drive, Nashua, N.H. 03060.

■ **United Software Security, Inc.** has announced a corporate license and an annual site license plan for its Privacyplus data encryption software for personal computers.

The license would allow companies to distribute the software to all employees at one site or, under a corporate license, throughout all of their locations. The software, which runs under Microsoft Corp.'s MS-DOS, reportedly requires use of only two commands — LOCK or UNLOCK — to secure software on hard disks or diskettes.

A corporate license costs \$2,400 per year, and an annual site license is \$800. A site is defined as a customer location with a specific street address, the vendor said.

United Software Security, Suite 100, 6867 Elm St., McLean, Va. 22101.

■ **Powerbase Systems, Inc.** has announced a version of its Powerbase data base management system software for the Wang Laboratories, Inc. Professional Computer.

The menu-driven Powerbase Version 2.1 for the Professional Computer is said to include a choice of two templates for task-specific applications, including job costing, human resources management, fixed assets, inventory control and sales prospect tracking.

Powerbase 2.1 resides in 320K bytes of random-access memory on the Wang microcomputer.

Powerbase 2.1 costs \$595.

Powerbase Systems, 12 W. 37th St., New York, N.Y. 10018.

■ **Century Analysis, Inc.** has announced Officeware, an integrated

and networking software package for the IBM Personal Computer, Personal Computer XT and AT.

The single-user version of Officeware is said to provide window-based, integrated word processing, spreadsheet, business graphics, records management, calendar, electronic filing and other functions. It also reportedly provides terminal emulation for IBM mainframe access.

The network version reportedly can connect Personal Computers to a central Personal Computer AT running Microsoft Corp.'s Xenix or provide interdepartmental networking and mainframe access in a local-area network. The network can be directly connected or gateway attached to non-Officeware host computers, depending on their interface capabilities.

Both versions reside in 512K bytes of memory on each micro.

The single-user version of Officeware, available in July, costs \$795. The network version, available in August, costs \$995.

Century Analysis, 114 Center Ave., Pacheco, Calif. 94553.

■ **Financial Decision Systems, Inc.** has announced the Corptax Linx package for its Corptax family of tax preparation software.

Corptax Linx is a corporate, tax-oriented trial balance system that runs on the IBM Personal Computer family equipped with a hard disk and at least 512K bytes of random-access memory.

Corptax Linx will import information from the company's Corptax Mainframe for the posting of tax reclassifications and Schedule M-1 adjustments, a spokesman said. The system features data-entry verification and the ability to produce customer reports using multiple general-ledger account structures.


Corptax Linx integrates data with Corptax Mainframe, Micro Corptax and other standard spreadsheets. Corptax Linx, coupled with Micro Corptax, is said to allow for the preparation of all federal and state tax returns — from books to producing tax forms ready for signature.

Corptax Linx costs \$850.

Financial Decision Systems, 28035 Dorothy Drive, Agoura, Calif. 91301.

■ **RG Software Systems, Inc.** has enhanced its PC Tracker inventory management software for the IBM Personal Computer, Personal Computer XT and AT.

Continued on page 78



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In an industry of "firsts," Oracle is proud to announce a "last." ORACLE is the last DBMS you'll need. Of course, we're proud of our "firsts," too. Like introducing the first relational DBMS and the first implementation of SQL back in 1979. Today, eight of the ten largest U.S. companies use ORACLE. In fact, INC MAGAZINE ranks Oracle as the fastest-growing software company in the USA. Surprised? Don't be. ORACLE is the number one relational DBMS, with thousands of installations on IBM mainframes, DEC, DG, HP and most other vendors' minis and micros, including the IBM PC.

Why not IDMS/R, FOCUS or DATACOM/DB?

Compatibility. There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. IDMS/R and the others aren't compatible with SQL. These non-standard DBMSs lock you into one vendor, one technology. Only ORACLE gives you total IBM SQL compatibility.

Portability. Few organizations today use only IBM mainframes. So why buy a DBMS that runs only on IBM mainframes?

Applications written with ORACLE run identically on IBM mainframes, DEC, DG, HP, AT&T, Stratus, Honeywell, Sperry and most other vendors' minis and micros, including the IBM PC.

Why not just go with DB2 or SQL/DS?

Capability. DB2 and SQL/DS are relational DBMSs. Period. ORACLE is a relational DBMS plus an integrated set of 4th generation tools for application generation, report writing, graphics and networking. Together, ORACLE's relational DBMS and tools reduce and often eliminate traditional programming.

Portability. DB2 and SQL/DS run only on IBM mainframes. Period. ORACLE runs on all your computers and operating systems, from MVS and VM, to VMS, UNIX and PC/DOS. But if your organization is committed to IBM's DBMS products, ORACLE on minis and PCs is a unique complement to either DB2 or SQL/DS.

What about Goldengate, dBASE III and pfs:File?

Connectability. The problem with Goldengate and the other PC packages is that they are completely incompatible with the software on your minis and mainframes. This incompatibility makes it difficult to share data, impossible to share programs, and forces users to learn multiple interfaces: One for the PC and another for the mini or mainframe. ORACLE is your standard software solution. All your machines - PC, mini and mainframe - run the same software and have the same user interface. And ORACLE's communications software lets you connect those machines in a network to easily share data and distribute the processing load.

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Software Notes

News for the DP professional



Rail car leasing is just one of the financial services supported by the GE Credit Corp. network. IBM's Information/Management helps GECC identify network problems fast.

Information/Management Helps GE Credit Keep Network On Track

"We have happier customers," says Tom Dixon, manager of computing and telecommunication services for General Electric Credit Corporation (GECC) in Stamford, Conn.

He is describing the use at GECC of IBM's Information/Management, Version 2—a licensed program that helps manage large data networks.

With assets of \$17 billion, GECC is one of the country's largest commercial lenders—active in retail credit, commercial leasing and mortgage banking.

And GECC operates a very large network: one with more than 2,000 terminals. The users, Mr. Dixon's customers, are in GECC field offices, retail stores and GECC client offices. They operate workstations, point-of-sale terminals and credit authorization terminals.

IBM's Information/Management program helps Mr. Dixon's staff use its computer to provide better service to customers. It enables the staff to record and retrieve all the data relevant to any network operating problems: the list of equipment at each site, the details of every communication link, a

complete record of every problem occurrence at each site, complete data on every type of equipment used in the network, and a detailed file on each vendor.

These data files can be searched to learn, for example, the history of a particular incident or of all previous occurrences of similar problems.

"We know our customer's environment," Mr. Dixon says.

"Over the telephone from GECC's customer support center, we can provide procedures to identify or correct the problem. We can see every change made to the telephone circuit serving that site. We can see all problems on that circuit, year to date. And we can talk to the telephone vendor in specific, geographic terms.

"We're automating ourselves so that our present staff

can handle a much larger network and a much greater rate of network change," Mr. Dixon continues. "We're already handling about ten times more devices than two years ago. And we're eliminating paperwork and becoming more responsive.

"Our next step will be to automate the management of network change with Information/Management." ■

Pacific Northwest Bell Creates Online System Fast

"This is a very large and complex system," says John Osterfeld of Pacific Northwest Bell Telephone Company. "Yet we were able to implement it with 12 programmers—half of them brand-new to programming—in a total of 13 months from preliminary design to an online production system.

"It would have taken at least twice as long without ADF."

Mr. Osterfeld, a system analyst for Pacific Northwest Bell, is referring to IBM's Application Development Facility (ADF). Designed for users of the IMS/VS data base/data communication system, ADF greatly reduces the

amount of programming required to create an application.

The programmers, under the technical guidance of Mr. Osterfeld, worked with ADF to develop a new version of the Customer Account Retrieval System (CARS) used by Pacific Northwest Bell representatives to call up account histories while answering customer telephone inquiries.

"We were up against a hard deadline. The application had to replace an older version within 13 months," he continues.

"Fortunately, ADF simplified the IMS programming to the point where we could meet the deadline using some people with

no programming experience at all.

"CARS now has several thousand users," Mr. Osterfeld points out, "and a very large data base. In our largest center, CARS handles 350,000 transactions a day—12 per second at peak times. So it is an application with a lot of demand on it. Execution has to be very efficient.

"And this version handles 28 I/O calls per transaction, compared to 20 or less in our previous system.

"In other words, the system as written with ADF is actually more efficient in execution than the conventionally programmed system it replaces." ■

IBM Software Experts Answer the Call to Keep Systems Running Smoothly

It's 2:00 a.m. You're testing a new application on a tight deadline. Suddenly, something—you don't yet know what—triggers an "abend."

With software, that happens. Each new hardware configuration, new application, or different combination of software releases is a unique environment that may cause a previously hidden problem to surface.

So, to keep IBM intermediate and large system customers up and running, the skills of more than 1,500 software service professionals are always on tap. Part of the IBM National Service Division, these professionals have the full power of special data bases at their fingertips.

You just call a special 800 number. At any time, 24 hours a day, seven days a week, you reach an IBM support center in Chicago, Boulder or Tampa. These locations service IBM's MVS, MVS/XA, DOS/VSE, VM and VS/I system products and the licensed products associated with them. The centers also service licensed products for the Series/1 and the 8100.

Often the IBM Program Support Representative (PSR) taking the call recognizes the problem and gives the customer a remedy. To help the PSR, IBM maintains a data base of symptoms and solutions for known problems. If the problem requires a revision to the code, the PSR has a Program Temporary Fix (PTF) sent to the customer by the fastest possible method—in some cases, by a telephone link.

Over 50 percent of problems are solved by the PSR. But when a problem is a new one, the customer is put in touch with a program specialist, who often is located near the actual developers of the software product.

On the most severe problems—those which have halted processing—the first goal is to find some remedy, such as a bypass, that allows work to resume. The objective is to complete this within 24 hours.

The second goal for the program specialist is a permanent solution. When this requires a new PTF, the objective is to develop and test it within 14 days. The specialist re-creates



To consult a data base of software symptoms and solutions, IBM representatives at customer sites talk by phone to these specialists at the IBM support center in Chicago.

the problem, functionally tests the new PTF, and then runs "regression tests" to be sure the fix is reliable.

To close the loop, IBM periodically makes available service updates which combine all recent program changes. ■

Cross System Product Set-Version 2 Recently Announced

With the recent announcement of Version 2, the IBM Cross System Product Set becomes a strategic productivity tool for large systems, as well as for intermediate and distributed systems. This application generator includes three licensed programs: one for creating applications, one for executing them and a third that permits end users to query the VSAM or CMS files.

The Cross System Product Set runs under all operating systems for 30XX and 4300 systems and under DPPX/SP in the 8100. With this version, support is added for IMS/VS/DB and DL/I as data bases for CICS/VS. In addition, it has been enhanced to run in systems with large networks of terminals.

Simplify MVS Installations

The IBM Custom-Built Installation Process Offering (CBIPO) is a simplified packaging of MVS. A CBIPO can cut the time to install an MVS system or subsystem from weeks to days.

Conventionally, a major system change involves a separate tape, documents and installation procedure for each program product.

With CBIPO, you first select the program products you intend to use with MVS. Then, with an automated process, IBM custom-builds an MVS system consisting of the ordered products in the form of distribution data sets.

The CBIPO also includes customized documentation that provides a step-by-step single installation path.

IBM Software for your Business Professionals...

If you're interested in the growing information needs of business professionals, you'll be interested in *IBM Software Notes for the Business Professional and Manager*, an advertisement in recent business publications that featured these products:

- IBM's Query Management Facility (QMF). QMF is part of Dow Corning's end-user computing program. QMF lets employees do ad hoc queries on relational data bases.
- The Information Facility (TIF). Pratt & Whitney manufacturing experts create computer applications quickly, easily and in plain English.
- Info Center/1 is a new functionally integrated decision support product, combining and enhancing three popular IBM products: ADRS, APL/DI, and FPS.
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6-17

MICROCOMPUTERS

Continued from page 75

Version 2.0 is said to allow ad hoc file searches and reporting for improved development of queries regarding inventories of micros, peripherals, software and accessories. Another enhancement reportedly makes summary report formats available for an improved overview of inventory. PC Tracker Version 2.0 resides in 256K bytes of memory and requires two disk drives.

The product costs \$495.

Current PC Tracker users may obtain a Version 2.0 upgrade free of charge.

RG Software Systems, P.O. Box 426, Fort Washington, Pa. 19034.

■ **Micro Concepts, Inc.** has announced hard disk drive management software for the IBM Personal Computer XT and AT.

The Master Menu uses a series of menus to permit users to find and run programs

stored on a hard disk. Passwords are said to allow owners or system managers to assign varying levels of security to users.

The software's File Commander function reportedly gives users the ability to execute IBM PC-DOS operating system commands with a single keystroke. Personal productivity tools reportedly include a personal time manager, a scratch pad to store notes and information and a group notice board to

post messages among users groups.

The Master Menu requires a hard disk drive system and minimum memory of 192K bytes. It costs \$142.50.

Micro Concepts, 4307 Arden Drive, Fort Wayne, Ind. 46804.

■ **Schacher, Greentree & Co.'s Greentree Software Division** has announced two software products designed to aid decisions made by

purchasing managers. Both products run on the IBM Personal Computer and Personal Computer XT.

Purchasing Electronic Notebook (PEN) is a menu-driven data base management and report generating product. The report generator includes a predefined format for item or vendor history reports.

Computer-Aided Purchasing (CAP) is said to be a decision support package designed for the purchasing environment. CAP includes all the features of PEN and uses the same data files but supports decisions through cost comparisons and tracking of discount break points or trigger item thresholds. CAP also features a template to assist the user in preparing customized print purchase orders for existing company purchase order forms.

Both products reside in 256K bytes of memory and require the Microsoft Corp. MS-DOS operating system.

PEN is priced at \$295 and CAP at \$695.

Schacher Greentree, 122 E. 42nd St., New York, N.Y. 10168.

■ **Interchart Software, Inc.** has announced enhancement of its Talkshow/PC graphics software for the IBM Personal Computer.

Release 2.0 of the software reportedly offers support for the Tecmar, Inc. Graphics Master graphics display board. It also includes software to support emulation of four graphics terminals, the Tektronix, Inc. 4027, 4010 and 4100 series and the Hewlett-Packard Co. 7221.

In addition, Talkshow/PC is said to include communications, file transfer, off-line recall of mainframe generated charts and the ability to output to a plotter or to produce an electronic slide show. It costs \$395.

Interchart Software, 104 Carnegie Center, Princeton, N.J. 08540.

■ **Omtool Corp.** has announced a version of its Softbol language system that runs under Microsoft Corp.'s Xenix Release 3 on the IBM Personal Computer AT.

The new version is said to allow applications written in Digital Equipment Corp.'s DIBOL to be transferred to the Personal Computer AT and other micros. The Xenix-based version also reportedly runs on other micros using Xenix, such as the Intel Corp. 286/310 and the Visual Computer, Inc. 2000.

Xenix-based Softbol is priced at \$625 for a single micro system.

Omtool, P.O. Box 477, 1445 Main St., Tewksbury, Mass. 01876.

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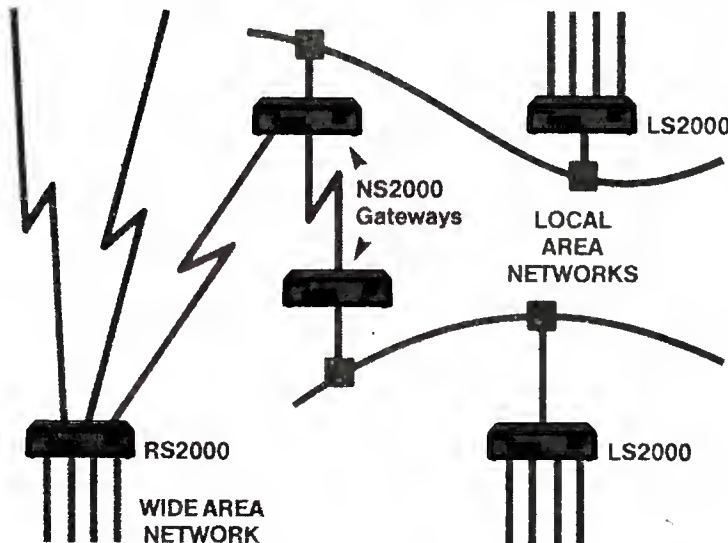
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^{*}X.25 and other networking capabilities are currently under development.

MICROCOMPUTERS

■ **Raima Corp. has announced an enhanced, multiuser version of its DB Vista data base management software for applications development in the C language.**

Version 2.0 is said to feature multiuser capability and shared file protection, transaction processing and the ability to import and export Ashton-Tate's Dbase II and Dbase III and Ascii files. The enhanced version reportedly includes interactive data base access utilities, one menu driven and the other command driven. The software can handle 16,000 records per file, according to the vendor.

DB Vista 2.0 requires the Micro-soft Corp. MS-DOS or Xenix or AT&T's Unix operating system, 128K bytes of random-access memory and a hard disk drive.

Cost of the product is \$990 with source code and \$495 without source.

Raima, 11717 Rainier Ave. S., Seattle, Wash. 98178.

■ **IBM has introduced a version of its PC/Videotex software for its Personal Computer line.**

PC/Videotex B1.10 reportedly supports the IBM Enhanced Graphics Adapter, allowing 16-color graphics to be produced on the IBM Color Graphics Display in a 320- by 200-pixel, medium-definition graphics format. Under PC/Videotex, users can access videotex services that use the North American Presentation-Level Protocol Syntax.

The software is priced at \$250. Subscribers to IBM's extended support program will be able to update to

the Version B1.10 for \$30. Nonsubscribers with the previous version will be able to update for \$55.

IBM Information Systems Group, National Accounts Division, 1133 Westchester Ave., White Plains, N.Y. 10604.

■ **Artelligence, Inc. has announced the Artelligence OPS5+ implementation of its OPS5 language, a high-level language designed to implement forward-chaining artificial intelligence programs. OPS5+ runs on the IBM Personal Computer.**

OPS5+ is intended to allow novice programmers to apply AI methods for expert systems development. The product features a window-based mouse/menu environment. Multiple windows reportedly allow a continuous display of separate information. Source code and interactions are handled in a large window, while other windows display messages, state-of-the-system information and a command menu, the vendor said.

OPS5+ is coded in the C language. OPS5+ is priced at \$3,000.

Artelligence, Knowledge Engineering Department, Suites 212-252, 14902 Preston Road, Dallas, Texas 75240.

■ **Macmillan Software Co. has enhanced the first three modules of Asyst, its software for scientific calculation, using the IBM Personal Computer, and added a fourth module that reportedly simplifies the General-Purpose Instrument Bus**

(Gpib)/IEEE 488 protocol.

The enhancements to Asyst are said to include expanded analysis capabilities and support for Gpib hardware. Also included are analysis of variance support and support for axonometric and contour plotting and plotting with error bars. Asyst's expanded color graphics ability reportedly allows easier interpretation of overlaying plots.

The fourth module is said to support more than 10,000 Gpib-compatible instruments and to enable commands to be modified and combined for specific applications.

The modules reportedly can analyze and reduce data, communicate with laboratory equipment and analog signal sources and offer basic mathematics, descriptive statistics and array manipulation.

The price of the modules ranges from \$495 to \$1,995. The entire package is priced at \$1,695.

Macmillan Software, 866 Third Ave., New York, N.Y. 10022.

■ **RSA Security, Inc. has introduced its Mailsafe security software for electronic mail systems. The software runs on the IBM Personal Computer.**

Mailsafe reportedly can authenticate both the source and the content of electronic documents, permitting them to be used as legal contracts in place of signed papers. It gains this capability, the vendor said, through use of a digital signature that is unique for each document.

Other abilities are said to include

verifying the source of a received message, assuring the integrity and authenticity of received data and electronically sealing sensitive data.

The software is priced at \$350 and will be available in the third quarter.

RSA Security, 1717 Karamenos Drive, Sunnyvale, Calif. 94087.

■ **Scitor Corp. has introduced its Project Scheduler Network, a project management software package for the IBM Personal Computer line.**

Project Scheduler Network reportedly offers spreadsheet-style data input templates and interactive graphics. Its project management capabilities include network diagrams, multilevel Gantt charts, work breakdown structure project organization and multiproject analysis.

The software is said to enable resources under its control to be allocated at any time within a job, to enable fractional resources to be assigned and to enable the user to use a mouse to select jobs from a pop-down menu. It is priced at \$495.

Scitor, 250 Lincoln Centre Drive, Foster City, Calif. 94404.

■ **Henco Software, Inc. has introduced a version of its PC Info software for the Digital Equipment Corp. Rainbow 100+ and Rainbow 190 personal computers.**

PC Info, the personal computer version of Henco's fourth-generation relational data management system,

Continued on page 80

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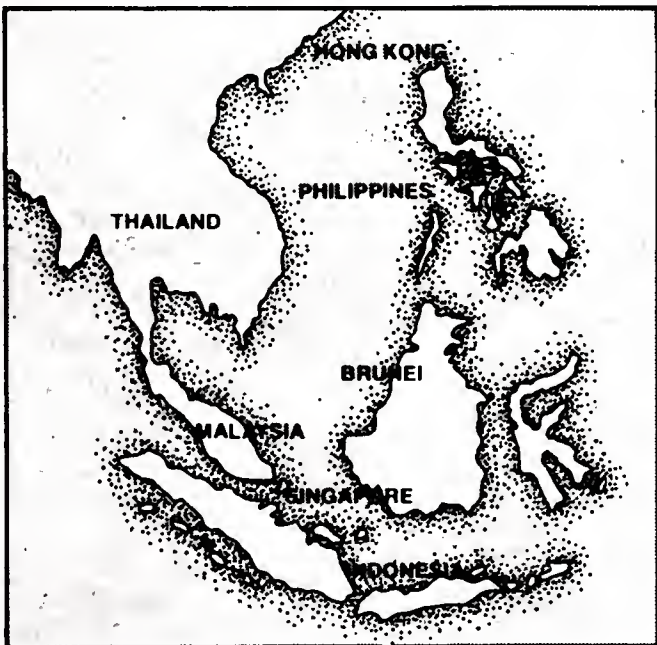


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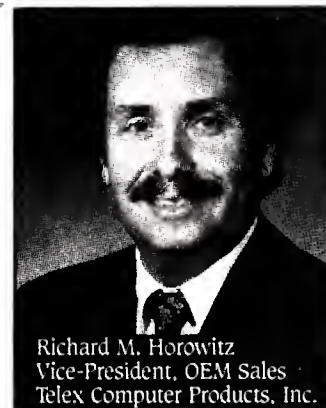


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MICROCOMPUTERS

Continued from page 79

reportedly lets users access existing Info applications, reports and files running on DEC VAX-11 series minis, Prime Computer, Inc. 50 series minis and on IBM Personal Computer XT and Personal Computer AT models in addition to the DEC Rainbow models.

The software reportedly uses a conversational language that enables users to create and maintain information in an accessible format.

PC Info requires 512K bytes of internal memory and Microsoft Corp.'s MS-DOS Version 2.1. It costs \$1,200.

Henco Software, 100 Fifth Ave., Waltham, Mass. 02154.

SYSTEMS

■ Tektronix, Inc. has announced

the 32-bit Tekstation AT graphics workstation based on the IBM Personal Computer AT.

The workstation can concurrently support Utek, the firm's version of the University of California at Berkeley's 4.2 Unix, and IBM's PC-DOS operating system, a spokesman said. It is also packaged with CAE Systems, Inc.'s CAE 2000 design software.

The system supports applications ranging from CAE-based design capture, to software development. The system offers a maximum of 4.5M bytes of random-access memory, 16M bytes of virtual memory and 280M bytes of local disk space. The system adds a National Semiconductor, Inc. 32016 coprocessor to the IBM AT.

Tekstation AT prices start at \$25,000. A file server configuration is available for \$40,000 and an Ethernet interface for \$1,400.

Tektronix, CAE Systems Division, 1333 Bordeaux Drive, Sunnyvale, Calif. 94089.

■ Micro Five Corp. has announced a microcomputer that is said to be fully compatible with the IBM Personal Computer AT.

The Micro Five Series 5000 is said to offer improved speed over the AT with direct memory access controllers to off-load the CPU, allowing the hard-disk subsystem to read and write a data track on a single revolution. The Series 5000's average disk access time is 30 msec or less.

The Series 5000 is available with Microsoft Corp. MS-DOS 3.1 or Xenix 3.2.

The Series 5000 Model 100 configuration is said to include 512K bytes of memory, a 1.2M-byte floppy disk

drive, an RS-232 serial port, a Centronics Data Computer Corp. parallel printer port, nine expansion slots, a clock-calendar with battery backup and an AT-compatible keyboard. It is priced at \$3,395. The Model 200 configuration also includes a 27M-byte formatted 5¼-in. hard disk. The Model 200 costs \$5,215.

Micro Five, P.O. Box 5011, 3560 Hyland Ave., Costa Mesa, Calif. 92626.

COMMUNICATIONS

■ GSD Systems, Inc. has introduced the Mac/5251, an interface between the Apple Computer, Inc.'s Macintosh and Apple II line of personal computers and IBM's System/34, 36 and 38 minicomputers.

The Mac/5251 reportedly permits the Apple machines to connect via their serial port over twinaxial cable. It provides both cable-through and address selection. When terminal emulator software is used with the interface, the Apple computers reportedly can emulate an IBM terminal.

Mac/5251 is priced at \$1,591.

GSD Systems, Suite 505, 600 S. Dearborn, Chicago, Ill. 60605.

■ Anderson Jacobsen, Inc. has announced three communications packages that run on an IBM Personal Computer and transmit data at speeds up to 2,400 bit/sec.

AJ Connection II Model 2412-2RA1, consists of an IBM Personal Computer plug-in modem, card guide, Software Synergy, Inc.'s Respond software and a phone cord with modular jack connector. Respond enables a user to store logon and setup procedures for 26 numbers and provides concurrent functions so that users can run a WP or spreadsheet program with the communications package.

The product works with Hayes Microcomputer Products, Inc.'s AT command language and offers full or half-duplex communication at speeds of zero to 2,400 bit/sec.

AJ Connection II Model 2412-2B01 includes the same hardware and Communications Research Group, Inc.'s Blast software, which supports asynchronous file exchanges in block mode. The software reportedly works with 110 types of computers.

A third package, AJ Connection II Model 2412-2C01, includes Microstuf, Inc.'s Crosstalk software.

The packages cost \$795 each.

Anderson Jacobsen, 521 Charcot Ave., San Jose, Calif. 95131.

■ Data General Corp. has introduced PC Liaison, a software package that enables users to transfer files between DG's Data General/One laptop computer and an IBM Personal Computer or Personal Computer XT.

PC Liaison also permits programs that are not copy protected to be run on the DG/One from the Personal Computer drives, the vendor said.

The software runs on any DG/One and any Personal Computer running under IBM's PC-DOS 2.0 or 2.1 with 192K bytes of internal memory, a floppy disk drive and an asynchronous port.

The package includes a 5-ft cable and is priced at \$180.

DG Desktop Division, 4400 Computer Drive, Westboro, Mass. 01580.

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MICROCOMPUTERS

■ **Digital Communications Associates, Inc. (DCA)** has announced that its Irma micro-to-mainframe interface is now available for use with the Data General Corp. Data General/One portable computer.

The new version reportedly enables the DG/One to emulate an IBM 3278/79 terminal, allowing the micro to communicate with a mainframe in an IBM 3270 environment. Irma allows users to transfer data to and from TSO, CMS and CICS mainframe environments, according to the vendor. The Irma board is said to fit into the expansion chassis of the DG/One.

The vendor reportedly modified Irma's terminal emulator program, E78, to be compatible with the DG/One keyboard. E78 revision 1.42 is said to remap the DG/One keyboard to include the numeric keypad found on the IBM Personal Computer.

Cost of the Irma board is \$1,195.

DCA, 303 Technology Park, Norcross, Ga. 30092.

■ **Racore Corp.** has announced a local-area network that can reportedly link up to 16 IBM Personal Computers, Personal Computer XT or ATs in any combination.

Racore-Net is said to use IBM Personal Computer Network software and the PC-DOS 3.1 operating system. The product reportedly uses token-passing ring architecture and has a 2M bit/sec. data transfer rate. Maximum distance between nodes is 200 ft, and an optional RS-232 data communications gateway is said to allow connection to remote networks.

The network can reportedly be installed in one full-length expansion slot of an IBM Personal Computer, Personal Computer XT or AT. It requires 256K bytes of memory.

Racore-Net is available for \$250 per node.

Racore, 10 Victor Sq., Scotts Valley, Calif. 95066.

■ **Mead Data Central, Inc.** has announced an enhanced version of its software that allows IBM Personal Computers and other microcomputers running Microsoft Corp.'s MS-DOS to access its Nexis news retrieval and Lexis legal research data bases.

Version 1.3 of Lexis/Nexis Communications Software reportedly includes the capability to create, save and recall searches from a user's micro file and is said to support additional models of 1,200 bit/sec. modems.

The Mead software is said to run on the IBM Personal Computer, Personal Computer AT and XT as well as on micros from AT&T, ITT, NBI,

Inc., NCR Corp. and Compaq Computer Corp.

Cost of the software is \$225.

Mead Data Central, P.O. Box 933, 9393 Springboro Pike, Dayton, Ohio 45401.

■ **The Wollongong Group** has announced networking hardware and software that reportedly links the IBM Personal Computer, Personal Computer XT or Personal Computer AT to Digital

Equipment Corp. VAX series minicomputers running DEC VMS or AT&T Unix operating systems.

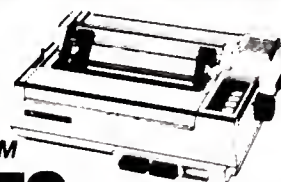
Wollongong Integrated Networking/Personal Computer (WIN/PC) reportedly conforms to Department of Defense Transmission Control Protocol/Internet Protocol communications standards. WIN/PC is said to run on either Xerox Corp. Ethernet V1.0 or IEEE 802.3 local-area networks operating at

Continued on page 82

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MICROCOMPUTERS

CENTER from page 73

fice furniture. Desktop sound covers are available for the printers that are placed on existing furniture. If sheet feeders are used, care should be taken to make sure the sound covers fit. This is simple logic, perhaps, but it is often overlooked.

■ Other supplies. Diskettes are used quickly, so a good supply should be on hand. Ensure that they are a reliable brand; they are used for valuable departmental data, so don't scrimp. Diskette boxes are a must if the diskettes are to survive storage and occasional transit. Storage boxes help organize disks and can be purchased with locks.

Price agreements for each item mentioned should be implemented prior to the delivery of the first microcomputer. Once you open the

doors of the microcomputer center and begin delivering equipment, holding training classes and answering questions, little time will be left for getting supply agreements in place.

The near necessities

These near necessities are dependent upon the condition of the building and staffing expertise.

■ Power conditioners. These range from simple surge protectors to line-conditioning systems and are needed to protect against power surges or outages. Line conditioning systems are the more expensive, but they are also more effective.

■ Maintenance agreements. These ensure that, despite occasional equipment failure, adequate backup and a method for fixing the equipment is available. It is important that

equipment be repaired quickly as users can become very reliant upon these machines. A rule of thumb to remember is that warranty work often takes longer than does regular, nonwarranty repairs.

■ An inventory system package. This will help support personnel keep track of all microcomputer center software and hardware.

■ An evaluation methodology. Setting up a methodology of this nature will help the staff evaluate new software or hardware offerings.

■ Consulting services. Consultants are available for evaluating software, writing custom programs, giving intensive guidance to a user or developing a complete system.

■ Additional phones. Microcomputer center phones tend to be in use constantly. This can be because users are asking for help, vendors are

asking for sales or staff members are asking vendors for information or help. A second, less publicized phone can be helpful. If dial-up data base services are to be used often, the center even may need a third or fourth phone line.

■ Plotters. Plotters provide an excellent way to present microcomputer usage reports to upper management. Taking surveys of the existing microcomputer users is a good method for keeping track of the organization's need, and a presentation made with a plotter can be effective. If a plotter is to be purchased, so must plotter supplies such as pens, paper, transparencies and cable-switcher boxes.

■ Equipment training. The microcomputer center manager should not assume that everyone knows how to use a microcomputer. Classes should be held regularly, and they should be mandatory for employees with microcomputers on their desks. Classes should instruct users on how to set up the equipment, load the operating system, protect and handle the diskettes, how to get to the tutorials and what a microcomputer can and cannot do. Classes should also clue users in on how to know when they are doing something wrong and when (and whom) to call for help.

■ Software training. This refers to four- to eight-hour classes that cover one software package. These courses should be provided frequently and should support a core of standard software packages including a spreadsheet, a word processing package and a data base. Using actual company-related data or spreadsheet samples will help. Training also should include refresher courses and roundtable discussions to assist the advanced user.

A last suggestion for the microcomputer center staff is to support a company users group to facilitate the advanced education needs that will develop once the equipment has been around for awhile.

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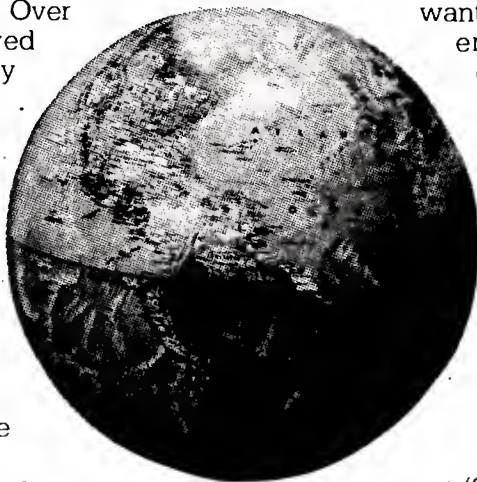
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Continued from page 81 10M bit/sec.

The product is said to give the micro full DEC VT100 terminal emulation capability, allowing users to transfer files to and from the VAX and create virtual circuits on local and wide-area networks. Files reportedly can be copied in either text or binary mode.

The WIN/PC hardware and software package is priced at \$1,375, according to the vendor.

The Wollongong Group, P.O. Box 51860, Palo Alto, Calif. 94303.

■ Micro Business Applications, Inc. has announced a network interface that allows its IBM PC-DOS and Microsoft Corp. MS-DOS accounting software to run on all networks that use the Netware operating system by Novell, Inc.

The Network Interface program is said to support file and record locking and automatic print spooling. It also synchronizes data and index file updates to ensure data base integrity. With the interface, Micro Business Applications' accounting packages will support multiuser and networking features.

The Network Interface costs \$595. Micro Business Applications, 12281 Nicollet Ave. S., Burnsville, Minn. 55337.

COMMUNICATIONS

Pin the tail on the market



DATA STREAM

John Dix
CW Senior Editor

A person with AT&T Communications called last week looking for a contact within the vendor of Starlan, a personal computer network made by sister company AT&T Information Systems.

The caller said he had seen a recent article in *Computerworld* describing the ability of AT&T Information Systems' mainstream local network to support Starlan. After making a few calls to AT&T, he hadn't been able to reach anyone that knew much about the personal computer network.

Laughing, the caller said "AT&T is still, after all, a big company."

Yes, big, and with some serious problems yet to overcome. This incident is further evidence of organizational and

marketing hurdles facing the corpulent grande dame of telecommunications.

To be fair, AT&T Information Systems is a nonregulated separate subsidiary of AT&T and, as an arm's-length subsidiary, there is supposed to be little interaction between the companies. This separation is stipulated by the Federal Communications Commission's Second Computer Inquiry decision, which deregulated new customer premises equipment. The decision required AT&T to separate Information Systems from AT&T Communications, the only long-distance communications carrier that is still regulated.

AT&T has been vigorously fighting the separate subsidiary ruling on Capitol Hill, saying it hinders the company's ability to compete. The classic reasoning behind the restriction is to keep AT&T from cross-subsidizing its competitive equipment business with revenue made from regulated long-distance services.

See **AT&T** page 85

Net vendors to do battle at meet

By Hank Bannister
Special to CW+

More than 12 major networking companies will square off in New York June 18 to compete in the first Local-Area Network Olympics.

The business people attending the event will not be treated to the spectacle of one Ethernet vendor wrestling with another, nor will crowds roar as an AT&T Starlan vendor breasts the tape inches ahead of a IBM PC Network proponent.

Instead, the hyperbolically named event will actually be a day of written and oral reports on case studies of local-area networking problems. But for the 200 to 400 MIS and DP managers expected to attend, the event may, in its own way, be as gripping as any horse race.

The Local-Area Network Olympics is an attempt by vendors to show direct comparisons between their systems, using the same environmental conditions to show how each firm can solve the complex and expensive problem of linking personal computers in a network. In the convoluted world of networks, such baldly direct comparisons are hard to come by.

Each network competitor will present his hardware solutions to three case-study problems sent to him in advance by the Personal Computer Corporate Forum, the program's host. The solutions should show exactly what hardware — including cabling, network cards and system software — is required to solve each problem and at what cost.

Each program participant will give a ½-hour oral presentation and supply written material documenting specific products, prices and installation procedures. Eight of the network companies will give both oral and written presentations; late enrollees will present their cases in written form

See **OLYMPICS** page 85

Bannister is a reporter for Infoworld, a sister publication of Computerworld.

■ Concord Data Systems slashed the prices of its 2,400 bit/sec. full-duplex modem when it added two products to the modem family/84

■ Icot announced a hardware fix to facilitate the sharing of data bases on IBM hosts/84

■ Western Union reduced its rates by up to 35% for its voice-grade, satellite private-line services/84

Interactive Systems/3M unveils 10M bit/sec. MAP net

ST. PAUL, Minn. — Interactive Systems/3M has introduced a local network that it claims is the first 10M bit/sec. product to conform to Release 2.1 of General Motors Corp.'s Manufacturing Automation Protocol (MAP) factory network standard.

Called LAN/II, the MAP network is said to support multiple-rate synchronous and asynchronous data links and meet both the IEEE 802.3 baseband and 802.4 broadband network standards.

In a broadband factory implementation LAN/II is a 10M bit/sec. network configured in a tree topology and accessed using a token-passing method. The required Headend Control System, a remodulator that is also used for and known as the Network Monitor Unit, costs \$27,740.

Terminals and hosts are connected via terminal servers. Several are available:

asynchronous servers range from \$509/port for a 16-port broadband server to \$1,463/port for a four-port box; a single-port High-Level Data Link Control (HDLC) server costs \$5,950; a two-port HDLC, \$7,790; and a three-port HDLC server costs \$9,590.

The MAP version of LAN/II for the office uses the IEEE 802.3 baseband version of carrier-sense multiple access with collision detection and Ethernet-type cable.

Baseband system components include a \$967/port four-port terminal server, a \$524/port eight-port box and a \$386/port 16-port server. Similar versions of the HDLC servers — with one to three ports — cost, respectively, \$4,950, \$6,790 and \$8,590.

The networks can be interconnected using See **MAP** page 85

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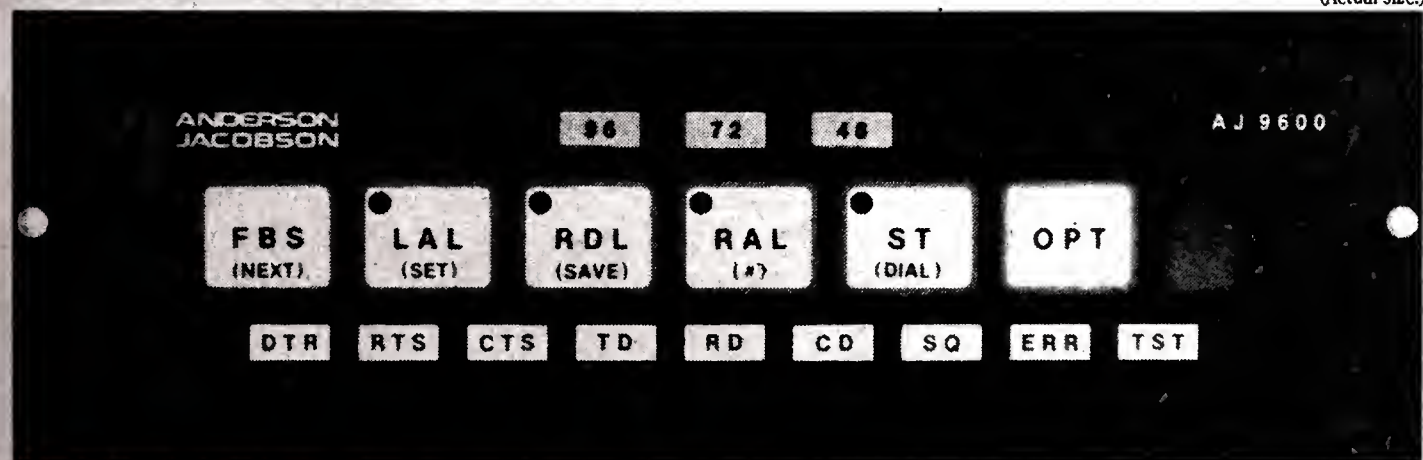
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COMMUNICATIONS

Concord Data lowers price

WALTHAM, Mass. — Concord Data Systems, Inc. has lopped nearly a third off the price of its 2,400 bit/sec. full-duplex modem and introduced two other modems, a version of the product that was reduced in price and a card modem for micros.

Concord Data's 224 Autodial, 2,400 bit/sec. asynchronous/synchronous, full-duplex two-wire modem reportedly has been reduced from \$795 to \$495. The standard Model 224 without autodial now costs \$450.

The 224 Series II models are based on a Rockwell International Corp. chip set, as opposed to the Intel Corp. set used with the older series.

The stand-alone 224 Series II is an asynchronous/synchronous, full-duplex modem that operates at 300, 1,200 and 2,400 bit/sec. It supports Concord Data's command set as well as the command set of Hayes Microcomputer Products, Inc.'s smart modem. The modem can autodial up to 10 numbers and supports the error-correcting Microcom, Inc. Networking Protocol (MNP). It will be available in August for \$595.

Concord Data also announced the 224 PC Modem, a single-card modem for internal use in IBM Personal Computers, Personal Computer XT's and AT's. The full-duplex, two-wire PC Modem is also based on the Rockwell chip set. It is an autodial, asynchronous/synchronous device and operates at 300, 1,200 and 2,400 bit/sec. Like the 224 Series II, the PC Modem supports Concord Data's own command set and that of Hayes. Available in June, the \$695 modem will not be available with the error-correcting MNP until August.

Concord Data Systems is located at 303 Bear Hill Road, Waltham, Mass. 02154.

Western Union rates reduced

UPPER SADDLE RIVER, N.J. — Western Union Corp. has reduced its rates by up to 35% for its yearly voice-grade, satellite private-line services.

Cities included in the program are Atlanta, Chicago, Dallas, Los Angeles, San Francisco and New York. The company is also granting an additional 15% discount for companies that order 48 satellite voice channels for two years.

Western Union reportedly is offering free installation and echo cancellers on any of 154 city-pair routes for customers placing one-year orders by June 30.

For example, a New York-Los Angeles link would cost \$590 per month for a channel under the volume discount program, \$695 per month for a year-term order or \$965 on a monthly basis, according to Western Union. These prices are subject to approval by the Federal Communications Commission.

Western Union is located at One Lake St., Upper Saddle River, N.J. 07458.

Icot units ease data exchange via hardware

MOUNTAIN VIEW, Calif. — Icot Corp. has announced two communications processors that facilitate the task of sharing data bases on IBM hosts by providing the capability through a hardware fix instead of through software, according to the vendor.

The Crystalink 5220 Inter-Host Processor is reportedly the first communications processor to allow data exchange between two IBM hosts under the 3270 Binary Synchronous Communications (BSC) multipoint control protocol without any software modifications.

The processor has two 3270 BSC multipoint tributary lines and appears to both hosts as an IBM 3271

cluster controller supporting 32 terminals. Interhost message exchange is said to be handled by the device so that each host acts as if it is communicating with its own 3271. Up to 32 transactions can be conducted simultaneously at speeds up to 19.2K bit/sec. with a single physical connection. The communications processor supplies traffic flow and buffer occupancy status to the host, the vendor said.

The other device announced in the company's Crystalink 5000 series is the 5210 BSC Host Processor. This product is said to provide protocol conversion to enable a 2780/3780 batch-oriented IBM host to appear as a 3270 BSC device to an IBM 3270

BSC host. The product features user-modifiable time-outs and poll parameters and line speeds of up to 9.6K bit/sec.

The 5220 is reportedly being used by the Dow Jones News/Retrieval service for its Focus personal banking network. The 5210 is in use at Mellon Bank to link an automated teller machine network of small regional banks to Mellon's Cashstream network, Icot reported.

Prices for the 5220 Inter-Host Processor range from \$5,200 to \$6,300. The price for the 5210 BSC Host Processor ranges from \$4,000 to \$6,300.

Icot can be contacted through P.O. Box 7248, 830 Maudin Ave., Mountain View, Calif. 94039.

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COMMUNICATIONS

OLYMPICS from page 83

only. At the end of the program, each member of the audience will receive a copy of the written presentations.

The case study problems were designed by Ira Cotton, a consultant with Booz, Allen & Hamilton, who formerly worked for the National Bureau of Standards where he established networking standards for government and White House hardware procurement.

According to Norman Dolph, president of the Personal Computer Corporate Forum, Cotton designed the network problems as three distinct scenarios intended to encompass a range of practical problems. The corporate department problem entails hooking together 12 to 18 personal computers at a multifloor location. The general goal is resource sharing

and mainframe interfacing. The solution emphasizes wiring strategies.

The manufacturing/industrial problem involves hooking nine personal computers within a harsh working environment split between two separate buildings. The rapidly expanding small-business problem requires participants to link six personal computers from different manufacturers, keeping economical resource sharing in mind.

'Design time bombs'

According to Dolph, to solve the problems, participants will have to negotiate around "design time bombs that many companies haven't begun to deal with," such as large file sizes that challenge standard hard-disk configurations and long-wire runs that might or might not demand repeaters. Dolph said, "This is Out-

ward Bound for [local-area network] vendors."

Participating companies include AST Research, Inc. of Irvine, Calif.; Corvus Systems, Inc. of San Jose, Calif.; Fox Research of Dayton, Ohio; IBM's Entry Systems Division in Boca Raton, Fla.; Network Development of Malvern, Pa.; Novell, Inc. of Orem, Utah; Quadram Corp. of Norcross, Ga.; 3Com Corp. of Mountain View, Calif.; Televideo Systems, Inc. of Sunnyvale, Calif.; and XComp of San Diego.

"Vendors will have to put their money where their mouth is," said Maxilyn Capell, public relations manager for Novell.

Attendance at the Local-Area Network Olympics costs \$325. More information is available from Personal Computer Corporate Forum, 279 E. 44th St., New York, N.Y. 10017.

AT&T from page 83

Equipment competitors favor the separate subsidiary requirement because it keeps AT&T from marketing products below cost and making up the difference with long-distance revenue.

They also like the ruling because it helps limit AT&T Information Systems' access to AT&T customer histories and curtails the flow of customer leads between the companies.

But even if the separate subsidiary requirement were lifted tomorrow, it would take AT&T a long time to circle its wagons to create a cohesive front.

Create forward movement

Rectifying duplication of effort — AT&T Information Systems and AT&T Network Systems market similar products developed from the same technology — would be time-consuming but not as hard as orchestrating the movement of corporate limbs to create forward motion.

A speaker at a recent conference chastised AT&T's marketing efforts and was later told by an AT&T person in the audience that he was right. The sales offices are being deluged by product information, the person said, but no one is sure what it all means or how it all fits together.

The inquiry from AT&T Communications is an indication of that confusion. And separate subsidiary ruling or not, AT&T must start coalescing the pieces and focusing the direction of the company.

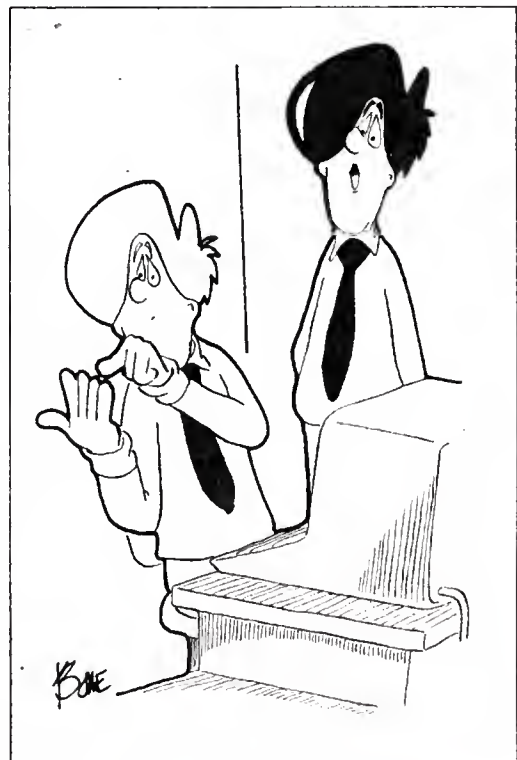
MAP from page 83

ing a broadband/baseband LAN/II gateway that costs \$7,250. Wide-area network gateways cost \$7,590 for broadband nets and \$5,590 for baseband implementations, according to the vendor.

All products reportedly support layers one to four of the MAP network model, which is styled after the International Standards Organization's Open Systems Interconnect network model.

LAN/II, which can be bridged together with Interactive Systems' LAN/I, is slated to be available in August.

More information is available from Interactive Systems/3M, which can be reached through P.O. Box 33600, St. Paul, Minn. 55133.



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SYSTEMS & PERIPHERALS

User: Quick installation for NAS 8083

By Donna Raimondi
CW Staff

OAKBROOK TERRACE, Ill. — One of the first users of National Advanced Systems, Inc.'s (NAS) 8083 multiprocessor said the system was installed in one week-end and has maintained a 99.9% uptime in the month and a half since then.

May & Speh, Inc. — a service bureau that provides time-sharing, direct marketing and custom programming to customers — bought the \$4.2 million machine in order to double its computer resources and add fault tolerance to its operations, said Kathleen Speh, marketing consultant to the company. May & Speh has a customer base of 1,000 clients, and more than half of them — most of the time-sharing clients — are now using the 8083, she said.

The NAS 8083 multiprocessor consists of two NAS 8063 machines tightly coupled in a multiprocessing configuration running as one machine under IBM's MVS/JES2 operating system, said Don Marquardt, the

service bureau's data center manager.

The system has 32M bytes of main memory and 32 channels, he added. It is connected to a disk storage system that includes 72 IBM 3350-type drives from

”

'We can run 30 batch jobs at the same time.'

— Don Marquardt
May & Speh, Inc.

Memorex Corp. and 32 IBM 3380-type devices from NAS — a total storage configuration of 45G bytes, he said.

When searching for a new computer, the company considered IBM's 3081 Model KX processor and an Amdahl Corp. 5780 multiprocessor, Marquardt said. IBM could not deliver the system the company need-

ed until nine or 10 months after it needed it, he said, and Amdahl was having trouble with its machine and delivery dates.

IBM's single-processor 3081 Model KX operates at 15 or 16 million instructions per second (Mips), and the NAS 8083 consists of two 8-Mips machines, so the difference would be in having one job running at 15 Mips or two jobs running at 8 Mips. "It's a toss-up as to which system would have been faster," he said.

Under MVS/JES2, the company runs IBM's CICS, TSO, ISPF and batch environments, Marquardt said. "We can run 30 batch jobs at the same time," he added. A typical daytime load is 80 to 85 TSO users, six CICS regions and 22 batch jobs running simultaneously, he said. The system operates around the clock all week, with no time scheduled for maintenance, he said.

Installation of the system was accomplished on a weekend at the end of April, Marquardt said. "I powered down at 9:00

See NAS page 88

■ MDB Systems unwrapped a pair of enhanced storage module drive disk controllers for DEC equipment/88

■ BDS released a laser printer that is compatible with Diablo's 630 printer protocols/88

INSIDE

Data Storage/88

Terminals/88

Printers/Plotters/89

Memorex fights DOD performance criteria



HARD TALK
Tom Henkel
CW Senior Editor

Does the government have the right to impose quality and reliability sanctions on computer suppliers who bid on multimillion-dollar government contracts?

That is a stone Memorex Corp. overturned last week when it went before the General Accounting Office (GAO) with a complaint about the restrictions that the U.S. Department of Defense's (DOD) Defense Logistics Agency has imposed on a \$14 million to \$16 million request for proposal for IBM 3380-type disk drives and controllers. The complaint claims

that the restrictions, in effect, exclude Memorex from any hope of successfully bidding on the contract.

The outcome of the Memorex complaint will have an impact on the way government agencies procure computer hardware, and it may ultimately influence the way every MIS decision maker evaluates hardware.

Two Issues

The Memorex complaint centers on two issues. First, the Defense Logistics Agency has stipulated that 3380-type disk drives must be able to process, on the average, roughly 35 million I/O starts before a failure. That limit is based on monthly reports generated by a hardware reliability package offered by University Computing Co. (UCC) in Dallas.

Memorex's 3680 disk drive has consistently come in last in the UCC rating, well below the 35 million I/Os between failures. The Memorex drives are operating at about 8 million I/O starts between failures. Memorex does not contest the validity of the UCC hardware reliability monitoring service. In fact, a Memorex vice-president praised the service as one of the better methods of monitoring hardware performance.

The crux of Memorex's complaint is that the company feels the UCC service fails to take into consideration some extenuating circumstances. For example, the bulk of Memorex's 3680s have been installed fairly recently, compared to competing vendors' products. Therefore, Memorex contends it has a higher failure

See PROCURE page 89

SHOP TALK/WAYNE HEIMSOOTH

Developing friendly systems key in manufacturing

Configuring the hardware for a manufacturing system is only one part of the process. Another, sometimes difficult, aspect of developing a manufacturing system is creating a system that gives operators the necessary words and images to allow them to do their jobs, such as building parts, effectively.

Of course, the better the words and images are presented, the faster and more accurately operators will be able to perform their jobs. This is often referred to as user-friendliness, which consists of the following:

- Eliminating the need for operators to search for a document referenced by another document.
- Not requiring an operator to make judgments about which section in a document the manufacturing process really should follow.
- Eliminating the need for an operator to

interpret a blueprint or to determine the step-by-step tasks to be followed, and so on.

Lockheed Missiles and Space Co. is currently developing such a system. In addition to the features mentioned above, defense contractors also need to record specifically how the part was built. This is often difficult, because the development effort can sometimes change on a daily basis.

So, as a defense contractor, Lockheed must be able to get timely, revised instructions out to the shop floor to improve or correct a problem found in an earlier design. The company must also know how parts produced earlier were built in order to analyze a situation or problem found when that final product — a missile, for example — is tested.

After evaluating 14 different vendors, Lockheed decided upon a Hewlett-Packard Co. system consisting of an HP 3000 superminicomputer using HP's HPword word processing software, TDP electronic publishing software and a digitizing camera. The HP system turned out to be the least

expensive system of those evaluated.

The system Lockheed currently is developing takes text and data from a computer-aided manufacturing system and combines it with images and data from other systems into one work instruction package. In other words, the operator would not have to find and use numerous documents to follow the steps needed but would have one document with all required information merged together.

A generative planning system can be used to begin the process of work instruction creation and will be the controlling source for operational sequence statements and reference call outs. If any change is made, causing a revision to the instructions, the manufacturing engineer will return to this source system and make the change, guaranteeing that a new revision level is generated and that all systems needing this data receive the same data.

The output from this system will feed the HP 3000 and any other system that will need the

See LOCKHEED page 89

Heimsooth is project leader for factory automation systems, manufacturing, for Lockheed Missiles and Space Co., based in Sunnyvale, Calif.

SYSTEMS & PERIPHERALS

DATA STORAGE

■ **MDB Systems, Inc.** has released two enhanced storage module disk drive controllers for Digital Equipment Corp.'s PDP-11 Unibus and VAX series systems, with data transfer rates of up to 1.8M byte/sec.

The MDB-DK11-RM and MDB-DK11-RP hex-size controllers are said to operate disk drives with a storage module drive interface that can operate at the standard data rate of 1.2M byte/sec. as well as at the 1.8M-byte rate of the Fujitsu Ltd. Eagle disk drive.

When used with Control Data Corp. 9762 or 9766 disk drives, the disk controller generates packages that are media compatible with DEC's RM02 and RM05 systems, ac-

cording to the vendor.

Each version costs \$3,900 in single quantities, and OEM discounts are offered, according to the vendor.

MDB Systems, Box 5508, 1995 N. Batavia St., Orange, Calif. 92267.

■ **EMC Corp.** has announced add-on memory boards for Hewlett-Packard Co.'s HP 3000 computer systems.

The EMC HP-401 provides 1M byte of main memory for the HP 3000, models 39 through 48, according to the vendor.

The product is reportedly installed in the HP 3000 system without modification to the CPU or operating system.

The EMC HP-401 costs \$5,400.

EMC, 12 Mercer Road, Natick, Mass. 01760.

TERMINALS

■ **Logcraft, Inc.** has announced components of an integrated color graphics workstation that works with the company's Cardware system, a combination of hardware and software that gives IBM PC-DOS or CP/M 86 functionality to Digital Equipment Corp. computers. The DEC computers include the LSI-11 and VAX series machines like the Microvax I and II.

The color graphics workstation provides Cardware users with the color graphics capability of the IBM Personal Computer, the vendor said. The system is said to include a color display with 320- by 200-pixel (color) or 640- by 200-pixel (black-and-white) resolution. When not being used for Cardware, the workstation

reportedly emulates a DEC VT100 series terminal.

The workstation has two components: a daughterboard that is installed into a slot on the DEC equipment and a workstation pedestal, to which the user must add an IBM Personal Computer-compatible keyboard and monitor. The two components are connected using standard television-grade coaxial cable.

The daughterboard and workstation pedestal cost \$900.

Logcraft, 3 Graham Drive, Nashua, N.H. 03060.

NAS from page 87

p.m. Friday, and at 10:00 p.m. Saturday, it was up and running. We completely replaced the 8063 CPU that we had and added a bank of 3380-type drives and a [Hewlett-Packard Co.] laser printer in 25 hours," he said.

The company's TSO Trivial Command response time, normally 0.2 sec., has remained about the same, and the normal 0.5 sec. response time for CICS did not change, Marquardt said, but batch jobs run about 25% faster than before. May & Speh ran no benchmark tests because they bought the machine before it was actually on the market, he said. "We knew our business needed it, and we've been very satisfied with other NAS equipment that we owned," he said.

The 8083 multiprocessor configuration will run at 190% of the functionality of two single processors, Marquardt said, and on the first production day, he attained a 180% function rate. The system generally runs at 140% because the company has not placed enough work on it yet, he said. In two to three months, the new configuration will be filled, and he expects to order another large NAS computer at that time.

Space for the systems is not a problem yet. The 5,000-sq-ft computer room has seven CPUs from various vendors — three Prime Computer, Inc. 9950s; one Prime 750 minicomputer; one minicomputer each from Burroughs Corp. and Perkin-Elmer Corp. that belong to customers; and the NAS 8083.

"We call the 8083 the world's longest computer," Marquardt said. The 6-ft high, 3-ft wide machine stretches out 30 ft long, he said, just for the processors and main memory. A staff of 20 operators and tape librarians and four systems software people support the conglomeration of equipment, and 100 applications programmers write software for customers, he said.

For the \$4.2 million it spent, May & Speh received the CPUs, two operator consoles, a console printer and three power distribution units that convert 220 volts into 440 volts so the system can take power directly from the power company, Marquardt said. The system is air cooled by a standard computer room air conditioner, he said.

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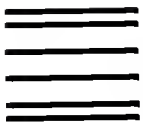
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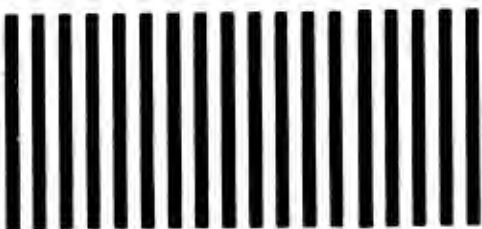
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SYSTEMS & PERIPHERALS

PRINTERS/PLOTTERS

■ North Atlantic Industries, Inc. has announced that two members of its 7000 family of printers have been modified to meet the U.S. government's North Atlantic Treaty Organization's Communications Security Information 5100A (Tempest) specifications.

The models 7020 and 7035 have been renamed 7020T and 7035T, respectively. The printers feature emulation of Diablo Systems, Inc. 630 daisywheel printers for word processing applications, an electrically alterable read-only memory for storing printer parameters and an extra 8K bytes of random-access memory for a total of 16K bytes to allow multiple fonts to be downloaded, the vendor said. The printers reportedly have both parallel and serial interfaces.

The 7020T costs \$3,590 per unit, and the 7035T costs \$3,990 per unit.

North Atlantic Industries, 60 Plant Ave., Hauppauge, N.Y. 11788.

LOCKHEED from page 87

same data and serve as the source of intelligence to assemble all the other parts needed to create a work instruction.

Documents that are referred are to be created on the HP 3000 using HPword and TDP for text and HPdraw and the digitizing camera system for images. Printed output, including images, can be sent either to a 12 page/min or 45 page/min printer.

The application programs that Lockheed will develop will take the intelligence out of the source data and combine the reference text and images from the other documents into one output document — the work instruction.

The result of this will guarantee that operators have all the necessary documentation at their fingertips to build a given part. Lockheed is also trying to ensure that incorrectly referenced documents can not be used, since the computer will merge the correct version of the text and image into the work instruction under automatic control.

Lockheed also hopes to build features into the system that provide for controlled changes and work status monitoring.

Any changes that can be made overnight will be done through the normal processing steps. There will be a procedure, controlled by computer, through which an authorized person can prepare and issue a change physically from the shop floor. Those changes that must appear in all subsequent revisions of the work instructions for that part number, will be tracked so their incorporation into the control system is ensured.

This same system will be used to give status to the preparation of work instructions. When a revised work instruction needs to be prepared, it will be logged as outstanding work and given a revision code. When the preparation has been completed, that part number and edition number will be locked out for changes (computer-controlled) and held in an approval status until all approvals are obtained. Finally, the work instruction will be computer-released for use when all approvals are obtained.

PROCURE from page 87

rate because most of its users are either testing and debugging their new Memorex drives (Memorex claims users deliberately allow multiple hardware failures in efforts to identify a system problem) or have not ramp-tested 3680s into full production.

The DOD said it would consider Memorex's arguments if the reliability ratings on the 3680s were getting better over time. But a spokesman said the 3680s seem to remain consistently in the basement of the UCC reports.

The second complaint Memorex has with the DOD is the department's stipulation that at least 25% of the disk control units purchased in its contract have either 16M or 32M bytes of cache storage. Memorex currently does not offer a disk controller with cache memory. Consequently, a Memorex bid for the DOD contract will be assessed a monetary penalty for not being able to meet the cache memory requirements. The financial penalty will make almost any bid by Memorex less attractive than bids from the competition.

The upshot of the Memorex complaint is whether a government agency can impose highly restrictive demands on bidders for specific contracts.

In a time when government agencies are facing public pressure over unwise purchases, such as hammers and ashtrays that cost several hundred dollars each, the DOD Defense Logistics Agency seems to have set a series of guidelines that it hopes will ensure the purchase of reliable products that adequately meet its needs.

The question Memorex appears to be raising is whether the statistical information used to develop the criteria for the DOD contract evaluates all vendors fairly.

Herein rests an issue that faces virtually all buyers of hardware: Statistics can be manipulated, misunderstood and misused. Marketing and sales people seem to have an

inborn knack of doing all three, choosing only those statistics that put their products in the best light. All other statistics always seem to be either invalid or not to apply to one's particular situation.

Consequently, it is getting progressively harder to get straight answers out of vendors — that is all vendors, not just Memorex. The result has been a growing distrust of the information presented by vendors.

Perhaps the hardest tasks facing DP executives charged with making large hardware purchases today is sifting through tons of vendor hype, trying to find usable information with which to compare competing products. If users cannot fully believe the information provided by the vendors, what's left?

Benchmark often a luxury

It is clear that products and services that claim to analyze products objectively will increase in popularity — and with good cause. It has already become impossible for users to run benchmark tests on every piece of hardware dragged into the data center. For many DP executives, an adequate benchmark on a mainframe, let alone on peripherals, is often a luxury.

If the GAO rules in favor of the DOD, Memorex will have forced the government to put a stamp of approval on third-party hardware evaluation services, and the services will flourish. If the ruling falls in Memorex's favor, the GAO may have hamstrung every government agency trying to cope in the increasingly hype-oriented computer marketplace.

Whatever the decision, there will be ramifications for commercial users. Third-party product evaluation services that are widely used by the government can quickly become standards in the private sector as well. Likewise, if the government bans use of such services, it shakes their credibility for everyone.

The advertisement is a black and white illustration. At the top left, the Polaroid logo is displayed next to the text "PerfectData". In the center, a Polaroid diskette is shown lying on a dark, irregularly shaped puddle that represents spilled tea. A teabag is visible in the upper right corner, with a string trailing off towards the diskette. The background is a light gray with a subtle grid pattern. At the bottom right, the text "Just our cup of tea." is written in a large, elegant script font.

Only the Polaroid Diskette in the gray box offers a free data recovery service. So, if you get a spot of tea on it, we can recover your data. (And most other accidents, too.) Call 800-241-4403. Because accidents happen.

Every software creator hopes to get great reviews.



Bob Hamilton got a medal for Enable.

"When PC Magazine's editors first saw Enable, we yawned. 'JAIP,' we said (Just Another Integrated Package). Okay, the spreadsheet was powerful. And yes, the graphics were sharp. And the word processor wasn't bad. Then the demonstrators took a graph and merged it into a text file. Not bad. Then they edited it. That was too much. 'You can't do that,' we said.

'Enable can,' they replied. And that's the real story behind Enable: Its creator, Bob Hamilton, was determined not to introduce a me-too product to a field that was soon to be swamped by lookalikes.'

Comments by Bill Machrone, the editor of PC Magazine, during the presentation of the magazine's First Annual Awards for Technical Excellence, Comdex, May 7th, 1985.

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COMPUTER INDUSTRY

Wall Street style helps Gartner grow

SECOND OF A FIVE-PART SERIES

By John Desmond
CW Staff

STAMFORD, Conn. — The phone in the marketing department of the information industry consulting firm rings repeatedly without being answered. The man making the call, the firm's president, scowls. He is not pleased. He tells his secretary to scold the marketing people for not answering the phone.

A high-paying client might have been making the call, not just Gideon Gartner. High-paying clients of the Gartner Group, Inc. expect instant responses to inquiries. The company prides itself on having senior analysts answer client inquiries directly on the telephone. That is one of a number of services offered by the six-year-old firm, which has shown impressive growth figures.

While the Gartner Group is not publicly held, its president freely offers the following revenue figures:

- \$600,000 in 1980.
- \$1.6 million in 1981.
- \$3.2 million in 1982.
- \$5.2 million in 1983.
- \$8.8 million in 1984.
- \$14 million in fiscal 1985, ended in March.

Grigsby Markham, the Gartner Group's senior vice-president of finance, said the firm was profitable in fiscal 1985 and broke even in fiscal 1984.



The company's growth has averaged 60% to 65% each year. The firm now has more than 140 employees and claims a 95% client renewal rate. "There is tremendous momentum," Gartner said. He projects revenue of more than \$22 million in fiscal 1986. The figures are consistent with a survey published in *Inc.* magazine in December, although a former Gartner Group employee suggested the latest figures may be slightly inflated.

The company claims it has some 1,000 individual clients. The breakdown by company is approximately 250 user firms, 125

vendors and 250 institutional investors, a spokesman said.

Funded by venture capital, the firm is bound to see changes in the future. "It's obvious that a company like ours, which is funded by venture capitalists, at some point either has to go public or has to sell itself. At some point, the shares get liquidated," Gartner said, but he did not indicate when that would happen.

At the Gartner Group's headquarters here, phrases like "net it out," "value added" and "bottom line" are frequently spoken. What distinguishes the Gartner Group from its competitors is its Wall Street style and staff experience, according to Gartner. Gartner worked for seven years gathering information for IBM before moving to Oppenheimer & Co., a Wall Street brokerage house where he worked in research until 1979. Gartner called this Wall Street style the firm's heritage. "The whole style of our company is a business style, whereas the styles of our competitors tend to be very data oriented, without

See **SERIES** page 96

■ AT&T Information Systems continued cost-cutting moves begun last year by recently announcing the elimination of 1,650 positions/**95**

■ Bruce T. Coleman, former president of Informatics General, was recently named president of Walker Interactive Products/**98**

■ Fujitsu recently realigned its U.S. microsystems division/**101**

U.S. firm calls for quotas on Japanese chips

By Clinton Wilder
CW Staff

SUNNYVALE, Calif. — A leading U.S. semiconductor manufacturer has called for quotas to limit Japanese imports in the wake of recent charges that Hitachi Ltd. is selling chips below cost to gain U.S. market share.

A spokesman for Advanced Micro Devices, Inc. (AMD), the No. 2 American maker of 256K-byte erasable programmable read-only memory (Eeprom) chips, said the recent allegations against Hitachi represented the proverbial last straw in the battle for market share. Hitachi is currently the leading supplier of 64K-byte Eeprom chips in the U.S., while two other Japanese chip makers, Mitsubishi Ltd. and Fujitsu

Ltd., are second and third, respectively.

"It's time to fight back," said AMD Vice-President of Communications Elliott Sopkin. "We've been slapped one time too many and [Jerry Sanders, AMD president and chief executive officer,] is outraged. We think we have to have a quota system. [Japanese vendors] have 17% of our 256K Eeprom market, and the U.S. has 10% of the Japanese [market], so we should limit their dollar imports to even them up. It's that simple."

The latest skirmish in what appears to be an inevitable U.S.-Japan high-tech trade war was touched off earlier this month when a U.S. trade official indirectly charged Hitachi with dumping, or selling below cost, 256K-byte Eeprom chips in the

U.S. Published reports indicated that Hitachi's Integrated Circuit division in San Jose, Calif., circulated a memo advising its distributors to offer chip prices 10% below those of AMD and Intel Corp., the leader in the 256K-byte Eeprom market, with profit margins guaranteed by Hitachi. Efforts to obtain a response from Hitachi were unsuccessful. Retiring U.S. Undersecretary of Commerce for International Trade Lionel Olmer made the charges at a Tokyo farewell dinner in his honor.

Sopkin said AMD's sales force has found the 256K-byte Eeprom prices offered by Japanese vendors have fallen much faster than the industry standard over the past several months. "It's obvious that the

See **QUOTA** page 100

Margin for error shrinking



INDUSTRY INSIGHT

Peter Bartolik
CW Senior Editor

If there is a bright light to the current computer industry slowdown, it is hidden far, far over the horizon.

When an industry is growing at an average rate of 20% to 30% annually, companies caught up in the hectic pace can get by with some minor problems. A seemingly insatiable demand for products serves to insulate management from the penalties of miscalculations.

But when the party is over — and it certainly looks like the last guests are heading for the door — those minor problems become monumental obstacles to a corporation's continued good health.

A case in point — Wang Labora-

tories, Inc.

One year ago, the company seemingly could do no wrong. Revenue had climbed above \$2 billion and the office automation giant seemed headed for \$3 billion and beyond; some even figured that eventually Wang could quite possibly displace Digital Equipment Corp. as the No. 2 manufacturer.

Those aspirations have come crashing down. And it is the small problems that are now hampering the company most.

When its compound annual growth rate was 30% or better, Wang could afford not to worry about complaints concerning service; the MIS manager could be suffered, if not ignored, because Wang owned the department that made the decisions; and if development schedules slipped, too bad, because customers were chomping at the bit

See **WANG** page 98

Inventor suing Wang, IBM for patent infringement

MIAMI — A 30-year-old Fort Lauderdale, Fla., inventor has added Wang Laboratories, Inc. to his list of patent infringement lawsuit targets and is expected to sue more computer industry giants in the coming weeks.

Robin Elkins last week filed a federal lawsuit against Wang in U.S. District Court here, claiming that the store-and-forward system in Wang's Digital Voice Exchange illegally uses analog-to-digital conversion technology that Elkins patented in 1978. Last month, Elkins sued IBM and its subsidiaries, Rolm Corp. and Rolm Corp. of Florida, on the same charge, citing IBM's Audio Distribution Systems and Rolm's Phone Mail products.

IBM was expected to file a formal response by today. IBM spokesman Lyle McGuire declined to comment on the suit until a formal response was drafted.

Elkins and his attorneys have filed patent infringement notices against some 50 companies in the past several years, but the actions against IBM and Wang are his first lawsuits. Don Feldman, an attorney for Elkins, said legal action is now being considered against several more companies.

Feldman said several companies rejected Elkins' technology as useless when the inventor tried to sell it to them in the 1970s, then later used the technology in their products. "As long as the industry continues to stonewall us and reap the rewards of Elkins' invention, we will continue to seek redress in the courts," Feldman said. "It would have been a much happier situation if the companies had negotiated with us in good faith, but it appears they have never taken us seriously."

The named plaintiff against IBM See **SUIT** page 93

COMPUTER INDUSTRY

Marketers beware: Bundling can violate antitrust laws



OUTSIDE LINES
A. D. Saunders

After litigation lasting some four years, a U.S. District Court of Appeals determined that Data General Corp.'s bundling of the Nova Rdos operating system with its Nova CPU and other peripherals violated the antitrust laws (Digidyne Corp. v. Data General, U.S. Court of Appeals for the Ninth Circuit; Docket Numbers 81-4628, 81-4667, 81-4671 and 82-4162).

To many DG customers, Rdos was among the best — if not the best — operating system on the market. Customers testified that it was "comprehensive, compatible, field proven and rapid, running four times faster than any comparably priced system. It was, in fact, the only full-service operating system available for the Nova CPU."

Nova Rdos and CPUs were sold mainly to OEMs, who put them together with their own application software products for resale. DG licensed Rdos to customers, but only to those customers who also purchased the CPU. DG also required licensees of Rdos to buy not only the CPU, but other hardware, usually peripherals, or pay a license charge. DG protected production of Rdos by trade secret agreements.

Tying arrangement

The requirement that a purchaser can obtain one product only by purchasing another is known in legal terms as a tying arrangement. In this case, the CPU would be known as the tied product, and Rdos would be the tying product.

According to DG, "the tie was devised to ensure recovery of the development costs" associated with Rdos. Furthermore, DG said that "it would be unfair to permit emulator CPU manufacturers to reap the benefits of [DG's] software research and development when they sell their competing CPUs for use with [DG's] software."

DG's decision to tie was made after a competitive manufacturer of Nova emulator CPUs requested permission to use Rdos.

Digidyne produced emulator CPUs that were "designed to perform the Nova instruction set and thus to make use of Rdos." Digidyne, the plaintiff in this case, claimed that the bundle that was required to be pur-

chased from DG unlawfully restrained trade and thereby violated the Sherman and Clayton Acts. Digidyne was correct in its analysis.

A tying arrangement is illegal in and of itself if three conditions are satisfied. First, the purchase of the tying product must be conditioned on the purchase of the tied product; second, there

must be sufficient economic power regarding the tying product to restrain competition in the tied product; and third, there must be an effect upon a substantial amount of commerce with respect to the tied product.

With those conditions satisfied, a detailed market analysis of the relevant market is not required; all that is

required is market dominance.

Market dominance is the "power to control price and to exclude competition . . . The crucial economic power may be inferred [however] from the tying products' desirability to any appreciable number of consumers or from the uniqueness in its attributes" (U.S. v. Loews;

Fortner I).

In other words, as long as "there are some buyers who find a seller's product uniquely attractive and are therefore willing to pay a premium above the price of its nearest substitute, the seller has the opportunity to impose a tie" (Fortner II). When such forcing occurs, competition on the merits in

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Saunders is a Boston-based attorney whose practice includes marketing issues.

COMPUTER INDUSTRY

the market for the tied item is restrained (Jefferson Parish Hospital), and the anti-trust violation occurs.

The requisite economic power also exists "when the tying product, here Rdos, is patented or copyrighted" because intellectual property protection "confers upon the defendant some advantages not shared by . . . competitors" (Fortner II).

The combination of copyright and the required use of trade secrets "established

both the distinctiveness of Rdos and a legal bar to its reproduction by competitors."

DG admitted that it would be impossible for competitors to develop operating system software performing all the functions of Rdos without violating DG's copyright and utilizing its trade secrets, and DG was aggressive about chasing those who appeared to be violating those proprietary rights.

Those who wished to

avoid being locked in by DG had to either abandon their own compatible applications software or convert their software to make it compatible with another disk operating system. The court found that conversion under these circumstances was not an economically realistic alternative. As a result, virtually no DG OEM customer had changed to a new supplier.

DG pressed the issue of product choice in the market. When OEMs select an

operating system, DG said, they know about the tie. At the point of selection, the OEMs are free to purchase or not. The point, however, is that initial choice is not synonymous with free choice: In the year the suit was initiated, 93% of DG's CPU sales were made to locked-in customers, who were, after the initial sale, also forced to buy from DG for their subsequent needs.

With respect to competitors such as Digidyne, the

cost of market entry was high as a result of DG's tie because Digidyne would have been forced to market both the CPU and a disk operating system that were competitive in price and quality.

Antitrust warning signs

The DG case outlines a few antitrust warning signs a company should be aware of in marketing its products. First, and most obvious, watch for tying. If products can be provided separately and selected separately by customers, a tie may be found if the products are not sold separately.

Second, a tying arrangement is assumed by the courts to be illegal if the tying product has a patent or is copyrighted.

Third, trade secrets have their place, but their use should be scrutinized where tying is involved. Fourth, if customers are complaining about the pains and penalties of the bundle, as DG's customers did, listen to them. Failure to do so may push them to get a hearing in court.

Fifth, with respect to pricing, do not attempt to recoup R&D costs by the tie. Software must be sold "separately, at a price that would reflect [R&D]." (U.S. v. Jerrold Electronics). Sixth, do not think for a moment that only monopoly power or a large or even significant share of the market is required to trigger a tying violation. The court in the DG case went to great lengths to dispel that notion. One customer may not hook vendors, but all that is required is the power to cause a customer to buy that which he might not otherwise have bought.

In sum, avoid a combination of factors that can lock in customers; tying arrangements, intellectual property protection, trade secrets and related agreements can create their own bundle of cost, liability and expense.

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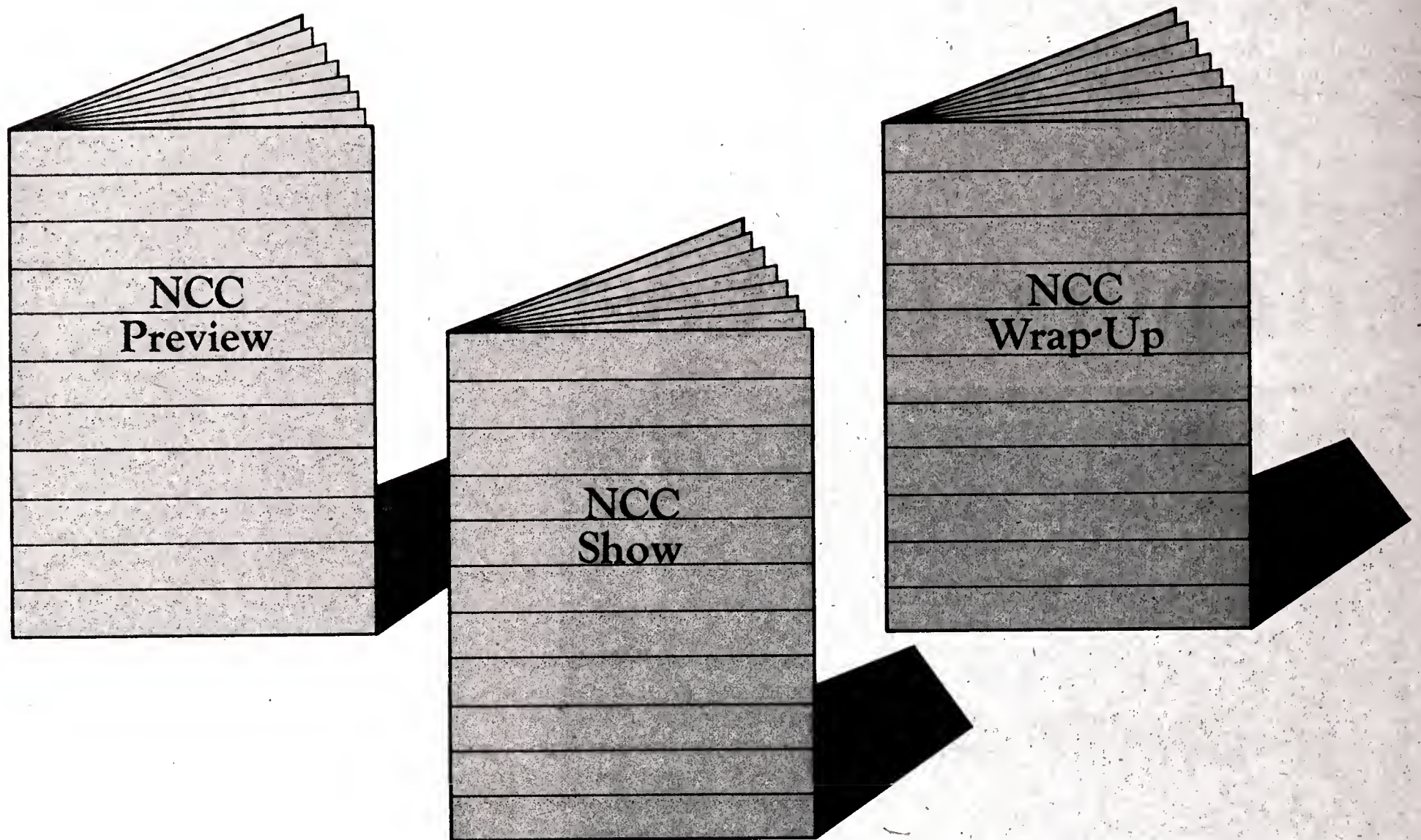
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SUIT from page 91

and Wang is Elk Industries, Inc., a Fort Lauderdale company established for the purpose of filing the suits. Elkins is the firm's major stockholder and Miami attorneys Feldman and Charles A. Levy are listed as officers.

Levy said the list of potential defendants includes both major telecommunications industry players and start-up companies using the allegedly patented technology in their products. "We're evaluating the companies one by one and will take action first against the ones most heavily involved in Florida," Levy said. "We're not looking to hurt anyone. We just want a reckoning by the courts of royalties due to Elkins."

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COMPUTER INDUSTRY

AT&T Information Systems to eliminate 1,650 positions

MORRISTOWN, N.J. — Citing an "ongoing effort to drive down unnecessary costs," AT&T Information Systems recently announced plans to eliminate 1,650 jobs in two of its four divisions.

A spokesman said the company would make "all kinds of efforts" to accommodate the employees with local and out-of-state job transfers, retraining and early retirement options. Dismissal of employees that cannot be placed will be a last resort.

The announcement signified AT&T Information Systems' largest job cut of 1985. The division eliminated 6,000 positions last fall as part of AT&T Technologies's reduction of its work force by 11,000 [CW, Sept. 4], the first major cut since the January 1984 divestiture.

The decision announced recently will eliminate

1,000 positions in the eastern region of the General Business Systems Division, headquartered in Atlanta, which markets computers and telecommunications equipment to small businesses. Additional job cuts within the San Francisco-based western region of that division will be announced soon. The operation within the division that markets products to consumers will not be affected.

AT&T will cut 650 jobs in a nationwide consolidation of repair centers in its Services Division, which repairs and maintains both computer and telephone-related products. The current 17 repair facilities will be consolidated in plants in Miami, Kent, Wash., and Plymouth, Mich. The 14 division offices closing their repair operations will remain open for nonrepair functions.

The cuts will not affect positions within the Large Business and Computer Systems Divisions of AT&T Information Systems.

Spokesman Craig Lowder said the cuts affect employees across the board in management, administrative and production line positions. He said the decision was part of AT&T's continuing effort to remain competitive in the postdivestiture environment.

"AT&T Information Systems was a company born with 128,000 employees and not a dollar of revenue," Lowder said. "Two years ago, we identified the need to cut costs nationwide. It's the story of change, and it isn't over. In a competitive market, you are constantly looking at ways to shed unnecessary costs."

Bell Atlantic settles with MCI, reduces liability of subsidiaries

WASHINGTON, D.C. — MCI Communications Corp. recently announced a settlement with Bell Atlantic Corp. reducing overall liability of Bell Atlantic companies in the two antitrust suits filed by MCI against the various entities of the former Bell system.

MCI said the settlement includes cash payments to MCI and a series of business relationships between the two companies. Details of the cash settlement were not released.

The business relationships include

arrangements for the seven Bell Atlantic local telephone companies to begin long-distance billing services for MCI and for those companies to purchase MCI's long-distance and other telecommunications services for internal use, MCI said.

The agreement was reportedly signed before a U.S. District Court jury award of \$37.8 million was handed down against former Bell System entities in favor of MCI last month. A second antitrust suit is expected to go to trial next year.

STC claims first-quarter net loss due to revenue-recording change

LOUISVILLE, Colo. — Storage Technology Corp. (STC) reported last week a first-quarter net loss of \$29.7 million, or 86 cents per share, much of which was attributed to a change in its revenue-recognition policy.

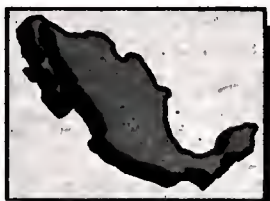
STC said \$16.2 million of the loss was due to the cumulative effect from prior periods of a change to record revenue later in the sales cycle; the new policy recognizes income after the products are installed, rather than when they are shipped.

The operating loss for the quarter

was \$13.5 million, or 39 cents per share. In the year-earlier quarter, the company posted a loss of \$16.7 million, or 48 cents per share.

Revenue for the quarter ended March 29 was \$81.6 million, down from \$98.4 million a year earlier.

Despite the slump for STC, which is operating under protection from Chapter 11 of the Federal Bankruptcy Act, Chairman and Chief Executive Officer Ryal Poppa said orders have been improving, although at a lesser rate than expected.



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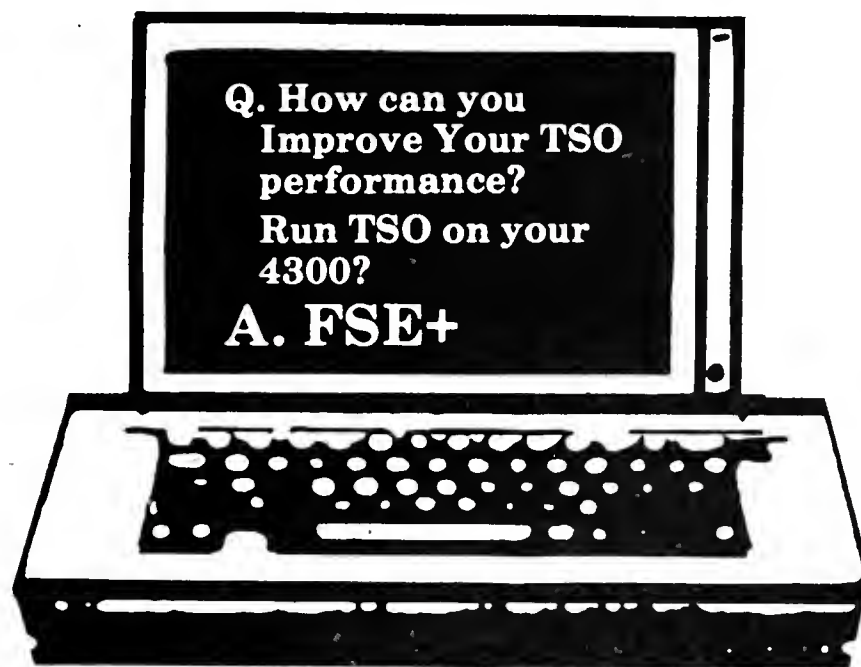
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COMPUTER INDUSTRY

SERIES from page 91

sufficient value added to that data," Gartner said. "On Wall Street, you can only succeed if you have clout, if you have impact. We have the same criteria for success in our company."

The company philosophy extends to its seating plan. Helmut Alpers, the firm's executive vice-president of products, said the Gartner Group's market research analysts and Wall Street analysts who work for its subsidiary, GG Group, Inc., a brokerage and investment advisory firm, are now seated side by side.

Alpers, who was once Gartner's boss when both men worked at IBM, said, "We want that interchange." Asked if this presents a conflict — whereas on the one hand the Gartner Group issues opinions on the viability of firms and on the other recommends investments to institutions — Gartner said, "Of course there are conflicts. The issue is that they have to be managed. We do whatever we can to manage the conflict." He noted that consultants sit separated from analysts on a Chinese wall basis.

Staff experience is a company selling point. Gartner described the staff experience at market research firms as a spectrum. At one extreme, he said, is the Gartner Group, which tends to hire experienced analysts, many of whom have worked for other consultants or vendors. "The other companies at the other extreme tend to hire young, bright MBAs," he said, listing Dataquest, Inc., International Data Corp. (IDC) and the Yankee Group as following his firm in staff experience. "Our orientation is to hire more expensive people."

But the company has embarked on an MBA program to achieve a better balance of senior to junior staff, al-

though Gartner claimed his firm will always be more weighted toward experience than is its competitors. "We may be a little too skewed toward senior people, and we will probably, over time, achieve a slightly different balance. But we will always be at the extreme end of the spectrum," he said.

On the viability of his competitors, Gartner said Yankee Group is under severe pressure in the market and Future Computing, Inc. has slowed down. "We grow because the market is increasing, but it is also obvious that we grow at the expense of our competition," he said. Gartner said he has a good relationship with all his competitors, with one exception. Litigation surrounding the hiring of a Yankee Group consultant by the Gartner Group several years ago has recently been resolved in the

Yankee Group's favor (see story below). But in the marketplace, Gartner said, especially in the telecommunications area, "We are beating Yankee Group. Yankee is losing in head-to-head situations with the Gartner Group the vast majority of the time."

Turnover has been low and morale high at the Gartner Group, its executives said. The company offers generous benefits such as a sabbatical after five years of service, a retirement plan that contributes 15% of salary and vests 20% annually and an employee stock option plan.

Morale was a problem for one former Gartner Group employee. "In the beginning, the Gartner Group emphasis was 'group.' Later, the emphasis became 'Gartner.' You could do anything you wanted, as long as it was exactly what [Gartner] wanted," said the former employee, who wished not to be identified.

Despite their differences, the for-



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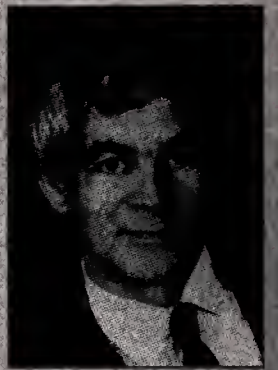
Employees - 140

Fiscal 1984 Revenues - \$8.8 million

Fiscal 1984 Profits - Break even

Specialization - Market research, strategic planning, institutional investment advice

AT A GLANCE



Gideon I. Gartner
Gartner Group, Inc.

mer employee credited Gartner for "being up on where IBM was going," and he credited the company for its financially oriented analysis. "They're not just going out and counting boxes," the former employee said.

Memorable successes

In six years of forecasting and predicting, the Gartner Group claims memorable successes. According to Peter Wright, a corporate vice-president, the most memorable success was the late 1981 prediction of Storage Technology Corp.'s (STC) demise. "That was a year earlier than the stock market recognized it," he said. It was mid-1982 when the stock market lowered estimates of STC's 1982 earnings, he noted.

Another success was the company's prediction in the fall of 1983 of the demise of the peripherals industry (low-end OEM market) companies, including Seagate Technology, Inc. and Tandon Corp. Competitors were optimistic about the OEMs until late 1984, Wright said, because they

overemphasized the capacity of producers in their analyses. The Gartner Group considered demand and then capacity, concluding that reduced prices, lower margins and industry consolidation would result, according to Wright.

Accuracy is the analyst's responsibility first, but any projections or forecasts are discussed in research meetings attended by senior staff. At a typical one- to two-hour meeting, an analyst offers a perspective on some significant event of the past week. Other analysts advance different perspectives, often challenging the first. According to Alpers, "We get a distillation of ideas. And an analyst [improves] pretty quickly when everyone is sharpshooting at him."

Vendors are cooperative in providing market research firms with product strategies and demonstrations, he said. "It's just a matter of [which firm] can absorb the most information and evaluate it most effectively for [its] clients," Gartner said.

The most expensive way that the
See SERIES page 101



GARTNER GROUP, INC.

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Industry Service	Umbrella analysis summarizing research from other eight industry segments	Both	
IBM Large Computer Market	Tracks major players in IBM 370 mainframe and compatible markets	Both	
Local-Area Communications	Trends and market in voice/data communications	Both	
Office Information Systems	Analyzes office automation area, integrated systems approach	Both	
Personal Computing	Views personal computer economics, distribution, alternatives, policy issues	Both	First service, \$17,000; all subsequent services \$12,000
Small Computer Systems	Analysis of IBM, Digital Equipment Corp., Data General Corp., Wang Laboratories, Inc., Hewlett-Packard Co., Prime Computer, Inc. and other players	Both	
Strategies in Telecommunications Services	Wide-area, Intra-Local Access and Transport Areas distribution; networks, communications services	Both	
Videotex	Strategies of players, videotex applications, networks, services	Both	

Source: Gartner Group, Inc.

Court rules against Gartner in Yankee noncompete suit

BOSTON — Judge James P. Lynch Jr. of Massachusetts Superior Court ruled here recently that a former employee of the Boston-based Yankee Group consulting firm violated a noncompete clause in his contract by going to work for the Stamford, Conn.-based Gartner Group, Inc. consultancy.

As a result of the ruling, the Gartner Group terminated the services of Richard Cohen, who had worked for the Gartner Group since August 1984. For two years prior to that date, Cohen had worked for the Yankee Group. The ruling prevents Cohen from working for a Yankee Group competitor until August.

The ruling also determined that Cohen had access to confidential Yankee Group information and that the Gartner Group and Cohen should be prevented from using the information until the August deadline expires.

The suit, which named Cohen and the Gartner Group as defendants, did not consider the issue of whether proprietary Yankee Group information was ever actually used by the Gartner Group.

Gideon Gartner, president of the Gartner Group, said the defense maintained that the noncompete clause was invalid because it was part of an overall agreement that was violated by the Yankee Group. Gartner also maintained that the Yankee Group's noncompete clause was not applied to all Yankee Group employees of Cohen's level at the firm.

Gartner said the ruling for the Yankee Group "is one of the worst miscarriages of justices ever seen. The judge totally misunderstood what was happening. It was a case that could not be lost." Gartner said he had no reason to appeal the decision because no damages have been assessed.

Gartner said the ruling could have an impact on future entrepreneurs who work for a company in a business related to their enterprise. "If I were [Digital Equipment Corp.], I would ask each of my young and immature employees to sign a non-compete" agreement, Gartner said. "If they went to start their own business, I'd enforce it."

See SUIT page 101

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85. Computer Service Bureau/Software/Planning/Consulting

90. Computer/Peripheral Dealer/Distributor/Retailer

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(Please Specify)

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COMPUTER INDUSTRY

Software firm appoints chief

SAN FRANCISCO — Former Informatics General Corp. President and Chief Operating Officer Bruce T. Coleman was recently named president and chief executive officer of Walker Interactive Products, Inc., a mainframe applications software firm based here.

Coleman succeeds company founder Jeffrey L. Walker, who will retain his position as chairman of the board.

Walker Interactive Products, founded 16 years ago, specializes in financial applications software and has five branch offices in the U.S. and one in London.

HP division targets OA mart

PALO ALTO, Calif. — Hewlett-Packard Co. recently expanded its objectives in the office automation market by establishing an Office Systems division.

The division will be responsible for directing the marketing of the HP 3000 microcomputer lines as OA products, the company said. Robert J. Frankenberg, operations manager of HP's Computer Systems division in Roseville, Calif., was named general manager of the division.

Frankenberg will be responsible for leading the push for OA products from the new division as well as the Sunnyvale, Calif.-based Personal Software division and the Office Productivity division in Pinewood, En-

gland. The company said it will continue to pursue the market for integrated office information systems with products such as HP Access software, a micro-mini link.

"HP intends to make a lasting contribution to the evolving [OA] market," said John L. Doyle, executive vice-president and general manager of HP's Information Systems and Networks group. "We have a strong and loyal customer base upon which to build a lasting position in this market."

In addition to the HP 3000 series, the company said it will more aggressively market to OA customers its Touchscreen II and Touchscreen MAX II micros.

Hathaway buys Global Software

DENVER — Hathaway Corp., which was unable to consummate a preliminary agreement to purchase Storage Technology Corp.'s (STC) 54% interest in Global-Ultimacc Systems, Inc., announced last week it had acquired the Global Software, Inc. division of Global-Ultimacc.

The Raleigh, N.C.-based software company was purchased by a newly formed Hathaway subsidiary for \$6.9 million in cash and notes. Global Software, a developer of applications packages for IBM computers, had reported 1984 revenue of \$8.4 million and was purchased in 1983 by STC for \$14 million.



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WANG from page 91

to be at the top of the shipment list whenever the products made it out the door.

But when growth slows, and then appears to be headed for the red-ink zone, those minor problems become very costly.

Bureaucracies created during a company's heyday suddenly become overwhelming debts; product delays result in money flowing out the door instead of the product; and customers realize that not only do they have the luxury of waiting and watching but also that the high-flying suppliers of yesterday could be the court-bound cripples of tomorrow.

Wang now finds itself beset and is rushing to cut costs to a manageable level. Analysts said it may take years for the company to get back on track. Its shipment schedule history hangs like an anchor around its neck; its concessions to MIS decision makers are too little, too late at a point in time when the solidness of IBM is going to look ever more attractive to buyers.

But Wang is just an example hanging out to dry for everyone to see. Its problems are greater because its goals were so far reaching.

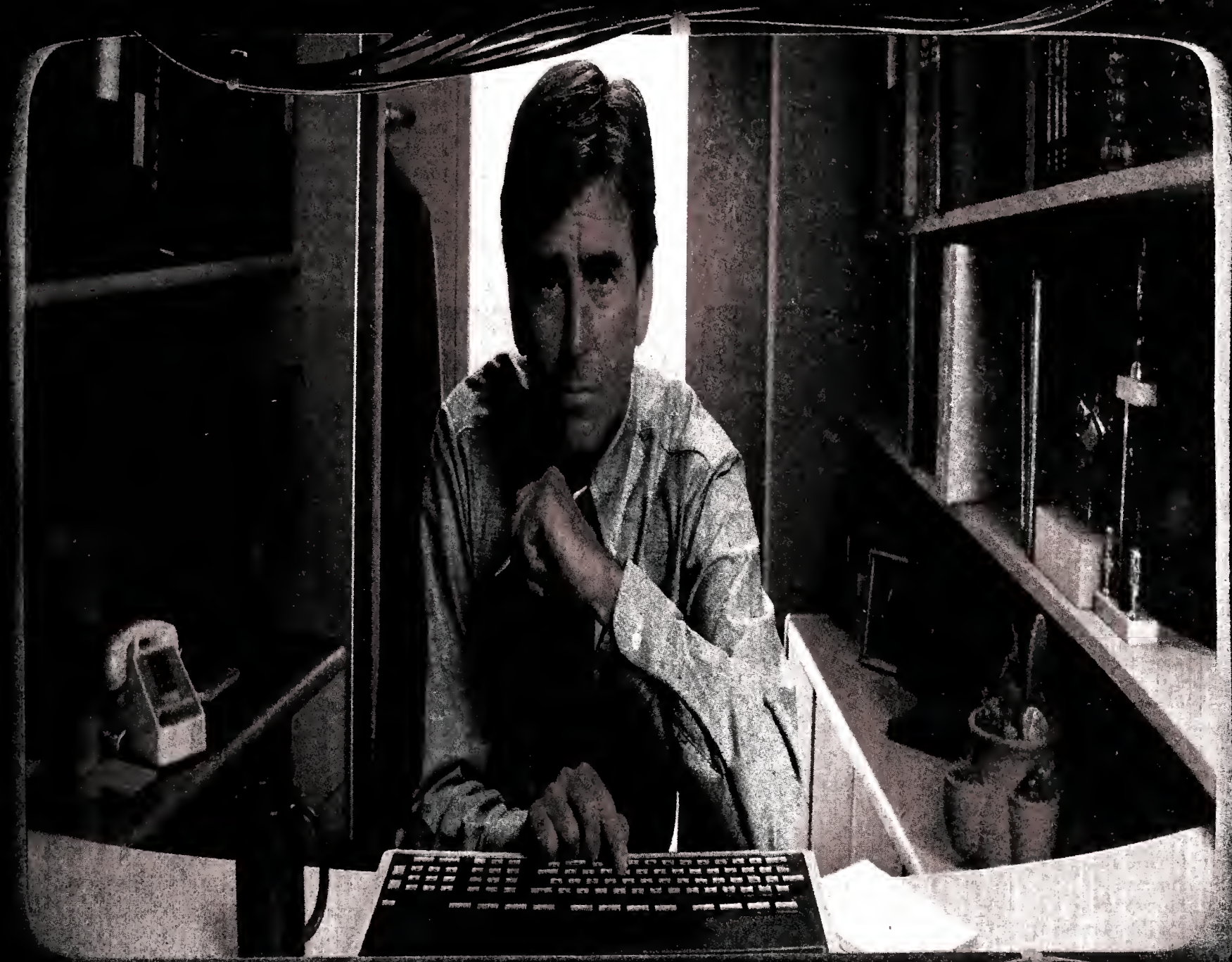
Other companies will follow with less noticeable cutbacks, but the effect will be the same. If even IBM, with its broad array of product sectors, is battenning down the hatches, a lot of other computer industry players will have to run and hide out from the storm.

E. E. Ferrey, president of the American Electronics Association (AEA) recently advised the AEA board of directors that he will turn over the chief executive officer functions to a successor this fall, while continuing as an officer and director until Dec. 31, 1987.

Head of the organization for 25 years, Ferrey reportedly will be elected vice-chairman of the AEA upon selection of a president.

Bell South Advanced Systems, Inc., a subsidiary of Bell South Corp., became the latest valued-added reseller of IBM equipment with the recent announcement that it will deal in IBM System/36 and Personal Computer products. The regional phone companies, several of which have opened or acquired computer retail chains, seem intent on using their market presence to carve out a piece of the computer sales pie.

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COMPUTER INDUSTRY

QUOTA from page 91

pricing of their [256K-byte chips] going from \$50 to \$20 to \$12 is significantly faster than normal, even in a downturn," he said.

Sopkin expressed concern that a Japanese market share edge in current 256K-byte Eprom technology could dampen American competitiveness in new chip technologies expected to enter volume production in the next two years, such as 1M-byte random-access memory (RAM) chips. "If we back away from Eproms now, it's like taking the appeasement approach in World War II," he said. "Let them have one market and they want the others. They've already made it impossible for anyone to make money in [dynamic RAM chips]; now they want to do the same in static RAM and Eprom chips."

"I think the public and the [Reagan] administration have passed over the trade issue for too long, but the public is beginning to realize we are liable to lose the technology battle," Sopkin continued. "If semiconductors go, so go computers."

Japanese vendors held 67.9% of the \$483.4 million U.S. 64K-byte Eprom market last year, according to Dataquest, Inc., a San Jose, Calif. market research firm. American manufacturers fear similar trends in the 256K-byte market, where Japanese vendors shipped 17.6% of the \$93.4 million worth of chips ordered by U.S. customers in 1984.

The Semiconductor Industry Association (SIA), while stopping short of calling for import quotas, echoed Sopkin's comments about the significance of the Eprom market. "Our big reason for concern is that [failure in] this market will drive U.S. companies out and they won't be able to compete in later generations of semiconductors," said SIA Manager of Governmental Affairs Daryl Hatano. "We're continuing to look at the situation and will formulate our response sometime in the future."

An Intel Corp. spokeswoman said the company is not recommending any specific action limiting access to U.S. markets, but will support "action that would open [the Japanese] market to competition."

Some industry observers believe most other U.S. semiconductor vendors will shortly begin pressuring the Reagan administration to adopt import quotas on Japanese chips. "There really are no free traders left in this industry sector," said A. A. LaFountain III, president of LaFountain Research Corp. in Bay Head, N.J. "At low points in the cycle people feel the pain so much that they cry uncle."

McDonnell Douglas taps info systems execs

ST. LOUIS — Two McDonnell Douglas Corp. vice-presidents have been appointed to head the aerospace giant's reorganized McDonnell Douglas Information Systems Group.

Robert A. Fischer, president of the former McDonnell Douglas Automation Co., was named to the post of executive officer of the Informa-

tion Systems Group.

Gary E. Liebl, former president and chief executive officer of McDonnell Douglas Computer Systems Co., was named the group's operating officer.

The move frees McDonnell Douglas President John A. McDonnell from direct responsibility for the Information Systems Group.

The group, which reported total revenue of \$1 billion last year, was formerly run by an executive board of all three men. McDonnell will return full time to his role as corporate president, the company said.

Fischer, whose office is based in St. Louis, will be responsible for strategic planning, policy formulation and

coordination, acquisitions and divestitures, group organizational matters and supervision of staff.

Liebl, whose office is based in Newport Beach, Calif., will be responsible for the Information System Group's business units, operating plans, productivity programs and business unit organizational matters.

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COMPUTER INDUSTRY

Fujitsu regroups U.S. division into subsidiary

SAN JOSE, Calif. — Seeking to market its microcomputer systems in the U.S. more aggressively, Japan's Fujitsu Ltd. recently announced that its Professional Microsystems Division will become a wholly owned subsidiary of Fujitsu America, Inc. (FAI).

The division has been re-named Fujitsu Microsystems of America, Inc. as of June 1. It was previously owned by Fujitsu's other U.S. subsidiary, semiconductor maker Fujitsu Microelectronics, Inc.

"Fujitsu's expansion worldwide has necessitated this move to increase the marketing strength of its acknowledged technological leadership in the computer industry," said Fujitsu Mi-

crosystems Vice-President Wayne Wahlenmeier. "Our realignment with FAI will have a positive effect on our U.S. marketing efforts and will provide increased support as our product line develops."

Fujitsu hopes to spur U.S. sales of such products as its Micro 16S series of business computers and its recently

introduced Micro 16 System 2000, which is based on the Pick Systems Pick operating system.

The U.S. reorganization is the second realignment within Fujitsu this year. In April, the company consolidated its worldwide personal computer manufacturing, marketing and sales within its Computer Systems Group.

SERIES from page 96

Gartner Group obtains information is with the Comtec data base, compiled from a survey that cost \$3 million in its first year and \$2.7 million this year. Burke Marketing Services, Inc., a Gartner Group partner, compiles the data from 8,000 interviews, charting information technology use in 20 product categories.

Vendors are the target market for the Comtec data, which costs from \$50,000 to \$250,000 to buy, but Gartner Group analysts use Comtec to identify trends, Gartner said.

”

'The whole style of our company is a business style.'

— Gideon Gartner
The Gartner Group, Inc.

Users are another key source of information. "We are today the largest provider of services to large users of DP, telecommunications and office equipment in the world," Gartner claimed. "We effectively came from nowhere and have become the dominant force in that part of our business." He challenged any of his competitors who dispute the claim to compare client lists.

IDC, which is famed for its data, provides processor-oriented data that is not as well defined as data the Gartner Group provides, Gartner said. "We collect many more data points than IDC does. The IDC data files are oriented toward collecting information on processors and what software is in the processor. The clients are totally different," he said.

Gartner also claimed that no one competes with Comtec, while IDC competes with Focus Research Systems, Inc. and Computer Intelligence Co.

Alpers added, "The whole thrust of what we do here is to try to net it out for our clients."

SUIT from page 96

Yankee Group President Howard Anderson said, "We are very happy the judge [ruled in our favor], and we are happy that our proprietary information has been judged to be sacrosanct."

Anderson agreed with Gartner that the decision may have an impact on employees who leave one firm to work for another or to start their own firms, but he said the impact will be good.

Cohen has filed a counterclaim asserting that the Yankee Group deprived him of commissions he earned while a Yankee Group employee.

— John Desmond



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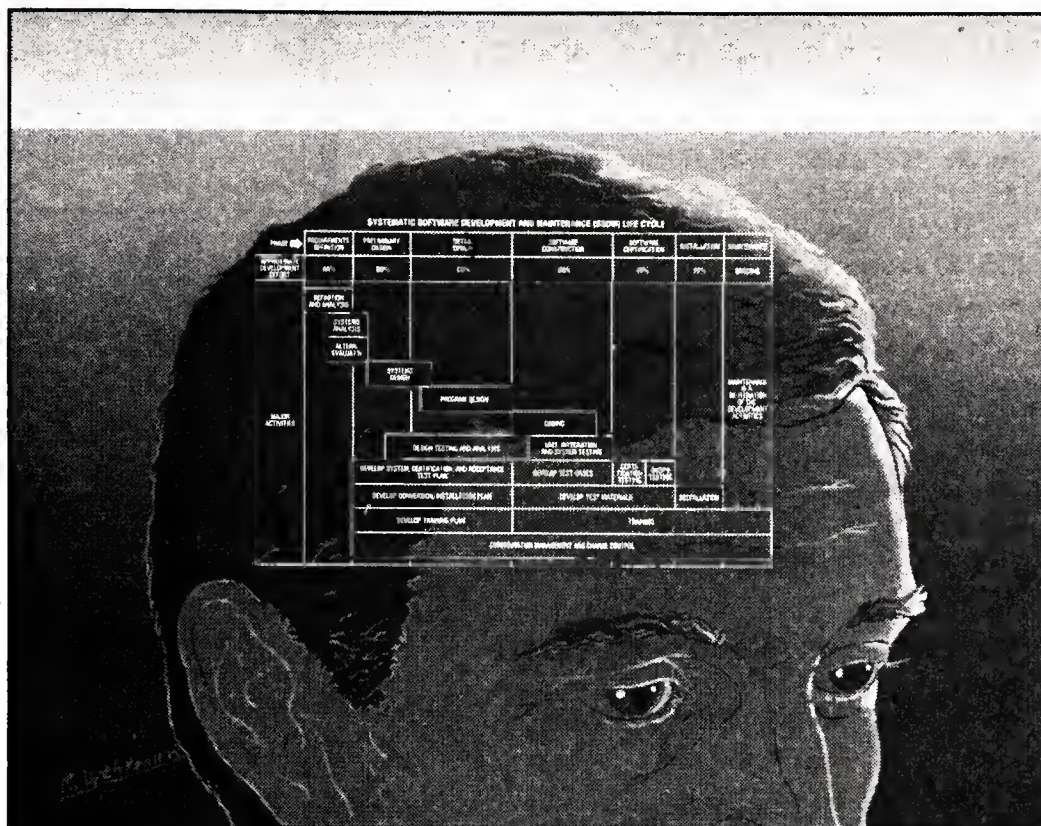
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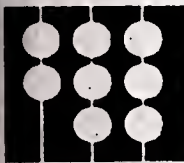
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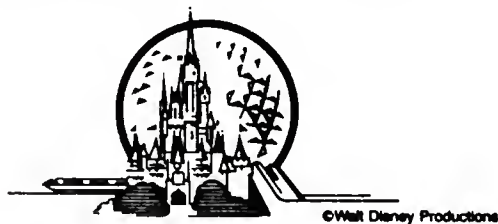
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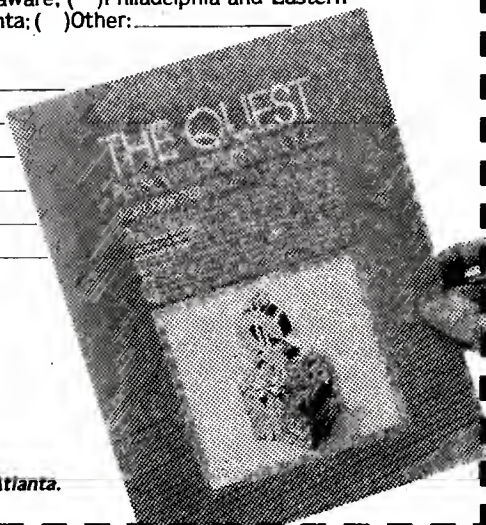


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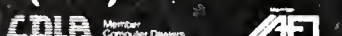
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ADVERTISERS INDEX

Ad Council.....	12
ADR.....	3
Anderson Jacobson	16,83
Applied Software	95
ARAMCO	63
AT&T Information Systems	38-39
Canon.....	33
Cermetek Microelectronics, Inc.....	53
CGA Software	65
ComDesign	78
Compaq Computer.....	70-71
Computer Associates	19
Computer Career Institute.....	75
Computer Corporation of America.....	46
Comshare	9
CW Asia	79
CW Broadcasting.....	23
CW Circulation	97
CW Corporate.....	82,100-101
CW Focus	56
CW Mexico	95
CW NCC Daily!/Special Report	94
Datasphere, Inc.	26
DeRex	31
Digital Equipment Corp.....	20-21
Equinox Systems	74
The Federal Computer Conference	18
Fischer Innis	57
Fusion Products	24
Help/38 Systems	48
Hewlett Packard	28-29
IBM	24-25,76-77,92-93
IDE Associates, Inc.	17
Infinet.....	32
Innovation Data Processing	7
Institute of Artificial Intelligence.....	15
Invitational Computer Conference	79
James Martin Associates.....	64
Leasametric.....	98
Levi, Ray & Shoup	10
McCormack & Dodge.....	27
Michaels, Ross & Cole.....	25

Micro Data Base Systems, Inc.....	8
MIS Training Institute	47
Mitron Systems Corp.	48
MSA	54-55
MTI Systems Corp.	11,13
National Retail Merchants Assoc.	81
Nestar	73
Netec	6
Network Management	80
Northern Telecom.....	67-69
Oracle Corp.....	74-75
Oryx Systems, Inc.....	72
Pan Pacific Conference	66
Peat Marwick & Mitchell	62
Polaroid	89
Polygon Associates	14
R Systems, Inc.....	59
Realia Inc.	88
Rolm Corp.	84-85
Samkha Corp.....	47
SAS Institute	58,60-61
The Software Group.....	90
Software International	42
Software Technologies & Research (STAR, Inc.)	66
Sony Video	36-37
Sperry Corp.....	99
SSCP	26
Syncsort	5
Sysed.....	23
Tandem	34-35
Telebyte Technology, Inc.....	10
Teletype Corp.	30
Telex	50-51
UCCEL	86
Uninet.....	22
Ven-Tel.....	120
Viking Software.....	16
Westwood Computer	81
Whitesmiths Ltd.	52
XA Systems Corp.....	26
Xerox Corp.....	44-45

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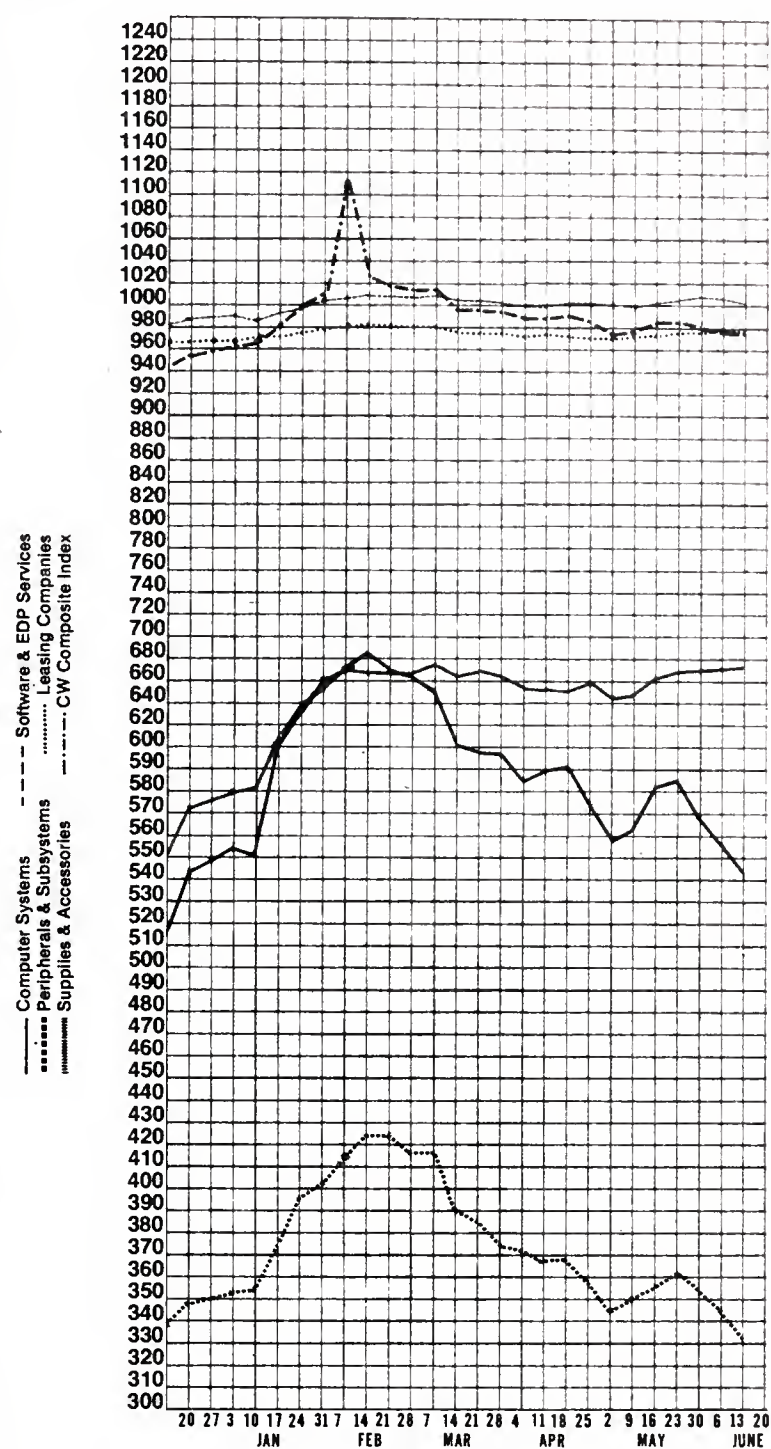
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		RANGE	JUN 12	NET	PCT	
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O	ALTOX COMPUTER SYST	7-21	8 7/8	-1	-8.1	
A	AMDAHL CORP	10-18	11 7/8	-7/8	-8.8	
O	APPLE COMPUTER INC	18-83	15 3/4	-1 1/8	-8.8	
N	AT&T	15-24	23 1/2	-1/4	-1.0	
N	BURROUGHS CORP	48-88	58 3/8	-3 1/8	-5.0	
O	COMPAQ COMPUTER CP	4-15	7 1/2	-1 3/8	-15.4	
O	COMPUTER AUTOMATION	3-17	5 3/4	-3/4	-11.3	
A	COMPUTER CONSOLES	7-20	8 3/4	-1/2	-8.8	
N	CONTROL DATA CORP	25-38	27 3/4	-3 3/4	-11.8	
O	CONVERGENT TECHNOL	5-41	8	-3/4	-11.1	
N	CRAY RESEARCH INC	39-82	78 1/2	+1	+1.2	
O	DATASYSTEMS CORP	18-38	22 3/4	-1 1/2	-8.1	
N	DATA GENERAL CORP	34-74	34 3/8	+3/8	+1.1	
N	DATAPoint CORP	12-28	13 7/8	+3/8	+2.7	
N	DIGITAL EQUIPMENT	77-125	83 1/2	-5 1/2	-5.3	
A	ECCO INC	12-18	14 1/4	0	0.0	
N	ELECTRONIC ASSOC.	13-7	4 5/8	0	0.0	
N	FLOTTING POINT SYST	3-31	11 1/4	-2 1/2	-2.2	
N	FORBOND	25-38	28 3/4	-5/8	-8.0	
N	GOULD INC	20-32	22 3/8	+2/8	+2.0	
N	HARRIS CORP	23-35	28 3/8	+1/8	+0.4	
N	HEWLETT-PACKARD CO	31-44	33 7/8	+1 1/8	+3.4	
N	HONEYWELL INC	48-88	58 5/8	+1 1/8	+1.8	
N	IBM	85-137	120 3/4	-7 3/4	-8.0	
O	IPL SYSTEMS INC	1-14	1 3/4	0	0.0	
N	ITT CORP	21-42	31 3/4	-3/8	-1.1	
N	M/A-COM INC	13-24	18 1/2	-1/4	-1.2	
N	MANAGEMENT ASSIST	2-28	2	-1/8	-5.8	
N	MATSUMITA ELEC(ADR)	52-81	57 5/8	+1/2	+0.8	
N	MODULAR COMPUTER SYS	6-10	8 5/8	-3/8	-5.3	
N	MODHAM DATA SCI	3-17	2 7/8	0	0.0	
N	MOTOROLA INC	28-44	31 1/2	+3/4	+2.6	
N	NAT'L SEMICONDUCTOR	10-17	11 1/2	+5/8	+5.7	
N	NSI INC	13-24	18 1/8	0	0.0	
N	NCR	21-31	28	-1/4	-0.8	
N	PERKIN-ELMER	18-30	24	+3/4	+3.2	
N	PRIME COMPUTER INC	11-20	18 5/8	+1/2	+3.1	
N	SPERRY CORP	35-57	58 3/4	+1/8	+0.8	
O	STRATUS COMPUTER INC	8-17	14 1/4	-1/2	-3.3	
O	TANDY COMPUTERS INC	15-40	17 1/2	-3/8	-2.0	
N	TRIMCO CORP	24-37	32 5/8	-2	-5.7	
O	TELEVIDEO SYSTEMS	3-41	2 5/8	-1/4	-8.8	
O	TELEXON CORP	8-21	20 1/4	-1	-4.7	
N	TEXAS INSTRUMENTS	88-150	83 1/4	+3/4	+4.1	
A	ULTIMATE CORP	10-24	11 3/8	-1/4	-2.8	
O	VECTOR GRAPHICS INC	0-32	3 3/8	+1/8	+1.8	
A	WARD LABS "B"	15-22	15 3/4	-1/2	-3.2	
A	WARD LABS "C"	18-32	18	+1/2	+3.2	
N	XEROX CORP	35-50	48 1/4	-7/8	-1.7	

LEASING COMPANIES						
O	BOOTH FINANCIAL CP	10-22	17 7/8	-3/8	-2.0	
A	CHI CORP	14-10	8 3/4	-3/8	-4.1	
N	COMDISCO INC	8-17	14 3/8	+1/4	+1.7	
O	CONTINENTAL INFO SYS	5-18	11 1/2	+5/8	+5.7	
N	OPF INC	10-18	18 3/4	-1/8	-0.8	
O	FINANCIAL GROUP INC	4-12	12 7/8	+1/2	+1.4	
N	PHOENIX AMERICAN INC	2-7	3 1/4	+1/8	+2.0	
O	SELECTEM INC	8-21	8 1/2	0	0.0	
N	U.S. LEASING	28-44	38 1/2	+1/2	+1.3	

COMPONENTS						
N	ADVANCED MICRO DEV	23-41	28	+7/8	+3.4	
N	ADV'D SEMICONDUCTOR	11-38	10 3/4	-3/4	-8.3	
N	ANALOG DEVICES INC	18-25	18	-1/2	-2.5	
N	ANALOGIC CORP	10-31	11 7/8	-1 3/8	-10.3	
N	APPLIED MAGNETICS CP	8-21	13	-3/8	-2.8	
O	HADCO CORP	4-12	4 3/8	-3/8	-7.8	
O	MICRO MASK INC	7-19	8 7/8	-1/8	-1.7	
N	TERADYNE	20-35	21 3/4	+1 1/4	+8.0	

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; S=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE \$10 PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

E X C H	N	PRICE				
		1985 RANGE	CLOSE JUN 12 1985	WEEK NET CHNGE	WEEK PCT CHNGE	
		SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	2- 8	3 1/2	- 1/4	-6.8	
N	ADVANCED SYSTEMS INC	8- 22	10 3/4	+1/8	+1.1	
O	AOS COMPUTERS INC	10-32	14 1/4	+3/8	+2.7	
O	AMERICAN SOFTWARE	9- 20	12 1/4	-1/4	-2.0	
N	ANACORP INC	1- 5	3 3/8		0.0	
O	ANALYSTS INTL CORP	5-17	10	-1/4	-2.4	
A	APPLIED DATA RES	18-38	33 3/4	-1/2	-1.4	
O	ASBNTON TATE	8-15	8 1/8	-1/8	-1.3	
O	ASK COMPUTER SYSTEMS	11-24	11 1/4	-3 1/4	-22.4	
B	ASTRADYNE CORP INC	1- 7	3	+1/4	+8.0	
N	AUTOMATIC DATA PROC	30-48	48 1/2	+1 3/8	+2.8	
O	COMPUTER ASSOC INT'L	15-35	24 3/4	+1	+4.2	
O	COMPUTER HORIZONS	8- 20	8 1/8	-1/2	-5.1	
O	COMPUTER NETWORK	5- 11	7 1/4	-1/4	-3.3	
N	COMPUTER SCIENCES	11-17	18 1/4	+1/2	+3.1	
O	COMPUTER TASK GROUP	8-18	13 1/2	-2	-12.8	
O	COMPUTER USAGE	1- 18	1 1/4	-1/4	-20.0	
O	COMPUTONE SYSTEMS	4- 23	8 3/8	-1/8	-1.8	
O	CONSERV CORP	1- 16	3 3/4	-1/4	-8.2	
O	CONSHARE	8-14	8 3/4	-3/8	-4.1	
N	CULLINET SOFTWARE	12-33	22 3/4	-1 3/4	-7.1	
O	CYCAR SYSTEMS INC	18-27	22 1/2	-1	-4.2	
O	NOGAM SYSTEM INC	5- 27	4 5/8	+1/8	+2.7	
N	GENERAL ELECTRIC CO	48-85	80 5/8	-2	-3.1	
N	GENL MOTORS E (EOD)	18-40	38 7/8	+1	+2.5	
N	GTE CORP	38-45	42 3/4	+1/8	+0.2	
N	INFORMATICS GENERAL	14-27	25 3/4	+5/8	+2.4	
O	INFORMATION SCIENCE	2- 17	2	0	0.0	
O	INFOTRON SYSTEMS CP	15-43	18 1/2	-1 3/4	-8.2	
O	KEANE ASSOCIATES	8- 18	17 1/2	0	0.0	
A	LOGICON	18-34	32 1/2	-3/8	-1.1	
O	LOTUS DEVELOPMENT CP	15-40	25 3/4	-2 3/4	-8.8	
O	MCI COMMUNICATIONS	8- 28	7 3/4	-1/8	-7.4	
O	MMOT SCI AMER INC	9-33	14 3/8	+1/2	+3.8	
O	MATHEMATICAL APP GRP	5- 18	4 1/2	-1	-18.1	
O	MICOM SYSTEMS INC	18-30	18 1/4	+1/4	+1.5	
O	MICROPRO INT'L CP	2- 10	2 1/4	-1/8	-5.2	
O	NATIONAL DATA CORP	8- 28	11 3/4	+1/8	+1.0	
O	ON-LINE SOFTWARE INT	4- 29	7 1/8	+3/8	+5.3	
O	PANASONIC SYSTEMS	11-30	22 3/4	+1 7/8	+8.8	
N	PLANNING RESEARCH	10-15	13	0	0.0	
O	POLICY MGMT SYST CP	22-35	23 1/2	-1 1/4	-5.0	
O	PROGRAMMING & SYS	4- 8	5 5/8	+1/8	+2.2	
O	REYNOLDS & REYNOLD	28-53	39	0	0.0	
O	SEI CORP	11-34	18 3/4	-1 1/4	-8.8	
O	SHARED MEDICAL SYST	23-43	28 5/8	+1/2	+1.7	
O	SCIENTIFIC COMPUTERS	5- 14	6	-1/8	-2.0	
O	SOFTWARE AD	8- 21	12 1/2	-1 1/2	-10.7	
N	URS CORP	10-14	12	+1	+8.0	
N	UCCEL	7- 17	13	-1 1/8	-7.8	

PERIPHERALS & SUBSYSTEMS						
P	AM INTERNATIONAL	2-7	4	-1/4	-5.8	
A	ANDERSON JACOBSON	3-11	3 1/4	-1/2	-13.3	
O	AST RESEARCH INC	7-20	14 1/4	-5/8	-4.2	
O	AUTO-TROL TECHNOLOGY	7-29	7 3/4	-3/8	-4.8	
O	AVANT-DARCE COMPUTNO	8-28	8	-1	-11.1	
O	BANCTEC INC	5-22	8 1/8	-5/8	-7.1	
A	BEEHIVE INT'L	1-7	1 1/2	-1/4	-33.3	
N	BOLT-BERANEK & NEW	17-30	24 7/8	-7/8	-3.3	
O	CAMBER CORP	1-3	1 3/4	0	0.0	
N	CENTRONICS DATA CORP	3-14	3	+1/8	+4.3	
A	CETEC CORP	8-12	5 7/8	-3/8	-6.0	
A	COINTEGRONICS	4-8	5	-7/8	-14.8	

E X C H	N	PRICE				
		1985 RANGE	CLOSE JUN 12 1985	WEEK NET CHNGE	WEEK PCT CHNGE	
		(1)				
N	COMPUGRAPHIC CORP	25- 37	26 3/4	- 1/4	-0.8	
N	COMPUTER TRANSCIEVER	1- 10	3/4	0	0.0	
N	COMPUTERVISION CORP	13- 48	12 5/8	- 7/8	-8.0	
N	CONRAC CORP	11- 17	13 1/4	D	0.0	
A	DATAPRODUCTS CORP	11- 28	11	+ 1/4	+2.3	
A	DATARAM CORP	4- 12	4 5/8	- 1/8	-2.5	
O	DATA SWITCH CORP	4- 41	4	- 3/4	-15.7	
O	DATUN INC	5- 17	8 1/8	- 1/8	-2.0	
O	DECISION DATA COMPUT	9- 19	10 7/8	- 1 1/8	-9.3	
O	ODCUTEL-OLIVETTI	3- 38	5 1/4	0	0.0	
O	ELECTRONIC S & H	1- 12	6 5/8	- 3/4	-20.8	
O	ENDEUTEL INC	3- 18	3 1/2	+ 1/4	+7.8	
O	EVANS & BUTHERLAND	11- 50	15 1/8	- 7/8	-5.4	
O	QANDOLF TECHNOLOGIES	8- 14	7 1/4	+ 3/8	+5.4	
N	QENL DATA COMM IND	13- 20	13 1/2	- 3/4	-5.2	
O	HAZELTINE CORP	3- 32	25 1/2	+ 1/4	+0.9	
O	ICOT CORP	3- 8	5 3/4	0	0.0	
O	INFORMATION INTL INC	10- 19	13 1/2	+ 1/4	+1.8	
O	INTECOM INC	4- 21	4	- 1/2	-11.1	
O	INTEL CORP	25- 45	25	- 1/2	-1.8	
A	LUNDY ELECTRONICS	7- 14	13	- 3/4	-5.4	
O	MEGADATA CORP	3- 8	4 1/2	- 1/2	-10.0	
A	MSI DATA CORP	7- 19	7 1/4	- 5/8	-7.8	
N	NABHUA CORP	18- 29	26 1/4	- 1/4	-0.8	
O	NETWORK SYSTEMS CORP	20- 25	20 1/2	- 1/4	-2.1	
N	NO AMERICAN PHILIPS	30- 45	34 1/4	-8 5/8	-20.1	
N	NORTHERN TELECOM LTO	30- 42	35 5/8	- 1/8	-0.3	
O	OMEX	1- 8	3/8	+ 1/8	+50.0	
N	PARADYME CORP	10- 18	10 1/8	- 1/8	-1.2	
A	PENRIL CORP	18- 24	11	- 3/4	-8.3	
N	PRESSCO (ADR)	20- 35	20 1/2	0	0.0	
G	PRINTRONIX INC	10- 34	10 1/4	- 1/2	-4.8	
O	QMS INC	8- 17	9 1/4	- 3/4	-7.5	
O	RAITEK CORP	4- 23	4	- 1/4	-5.8	
N	RECOGNITION EQUIP	9- 17	9 5/8	- 1/8	-1.3	
N	SANDERS ASSOCIATES	32- 51	35	+ 1 1/2	+4.4	
O	SCAN-TRON CORP	9- 19	13 3/4	+ 1/8	+0.9	
N	SCIENTIFIC ATLANTA	8- 14	11 3/8	+ 1/8	+1.1	
O	SEAGATE TECHNOLOGY	4- 20	8	- 1/2	-7.6	
N	STORAGE TECHNOLOGY	2- 12	2 1/2	0	0.0	
O	SYBEX DATATRONICS	1- 13	5/8	0	0.0	
A	T BAR INC	8- 11	5 7/8	- 1/2	-7.8	
A	TAB PRODUCTIONS CO	13- 20	18 1/4	0	0.0	
O	TANDON CORP	4- 35	4 3/8	- 7/8	-16.6	
A	TEC INC	8- 12	12	0	0.0	
N	TEKTRONIX INC	52- 88	56	- 2 7/8	-4.8	
N	TELEX	19- 47	38	- 3/8	-0.9	
N	TELESTA SYSTEMS CP	2- 17	2 1/8	0	0.0	
O	TIMEPLEX INC	13- 23	16 3/4	- 1/4	-1.4	
O	VISUAL TECHNOLOGY	1- 26	3/4	0	0.0	

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